December

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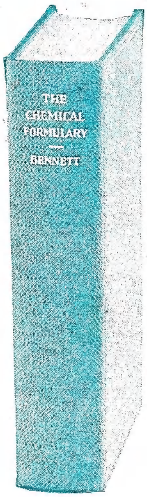

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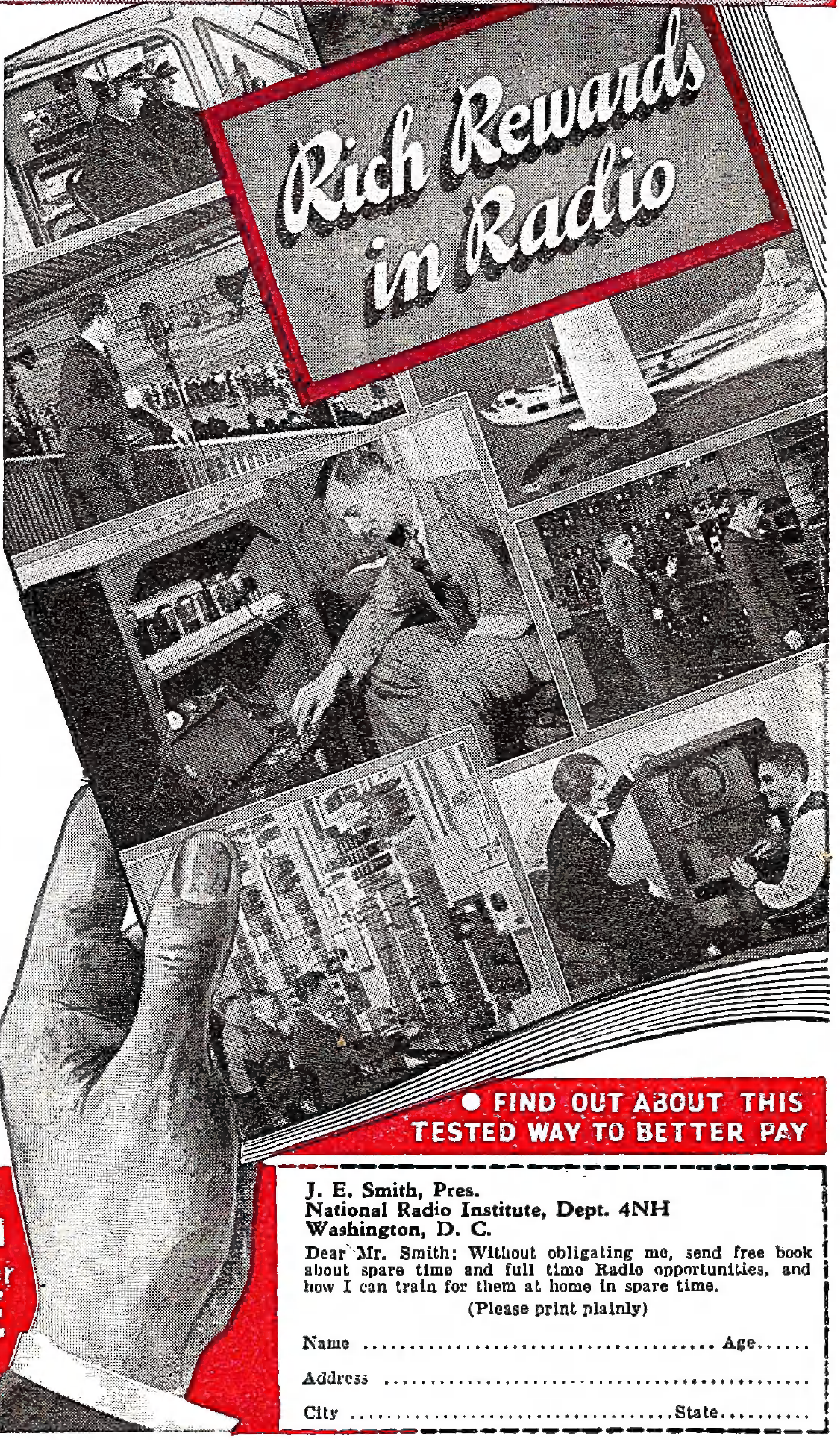

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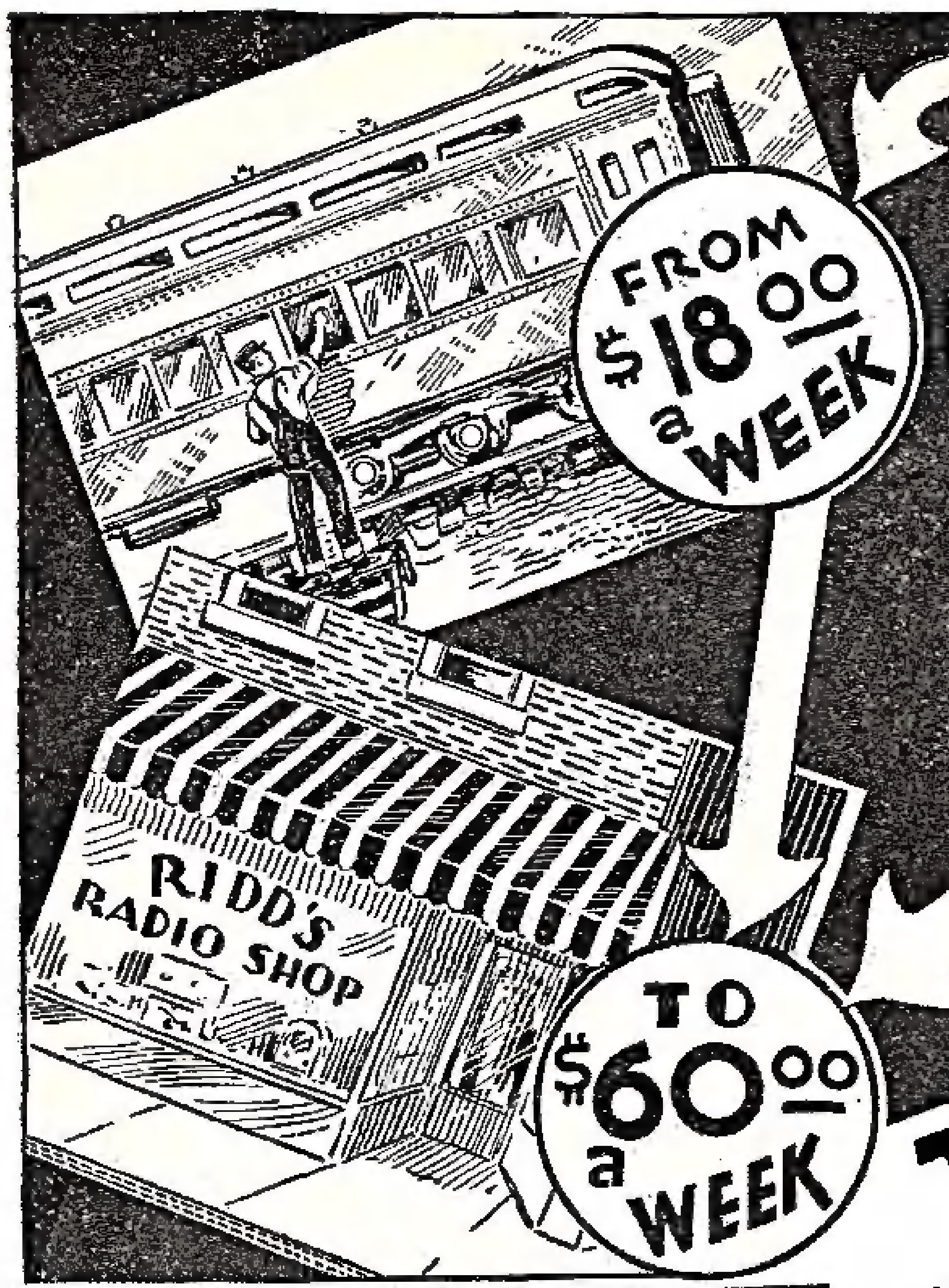

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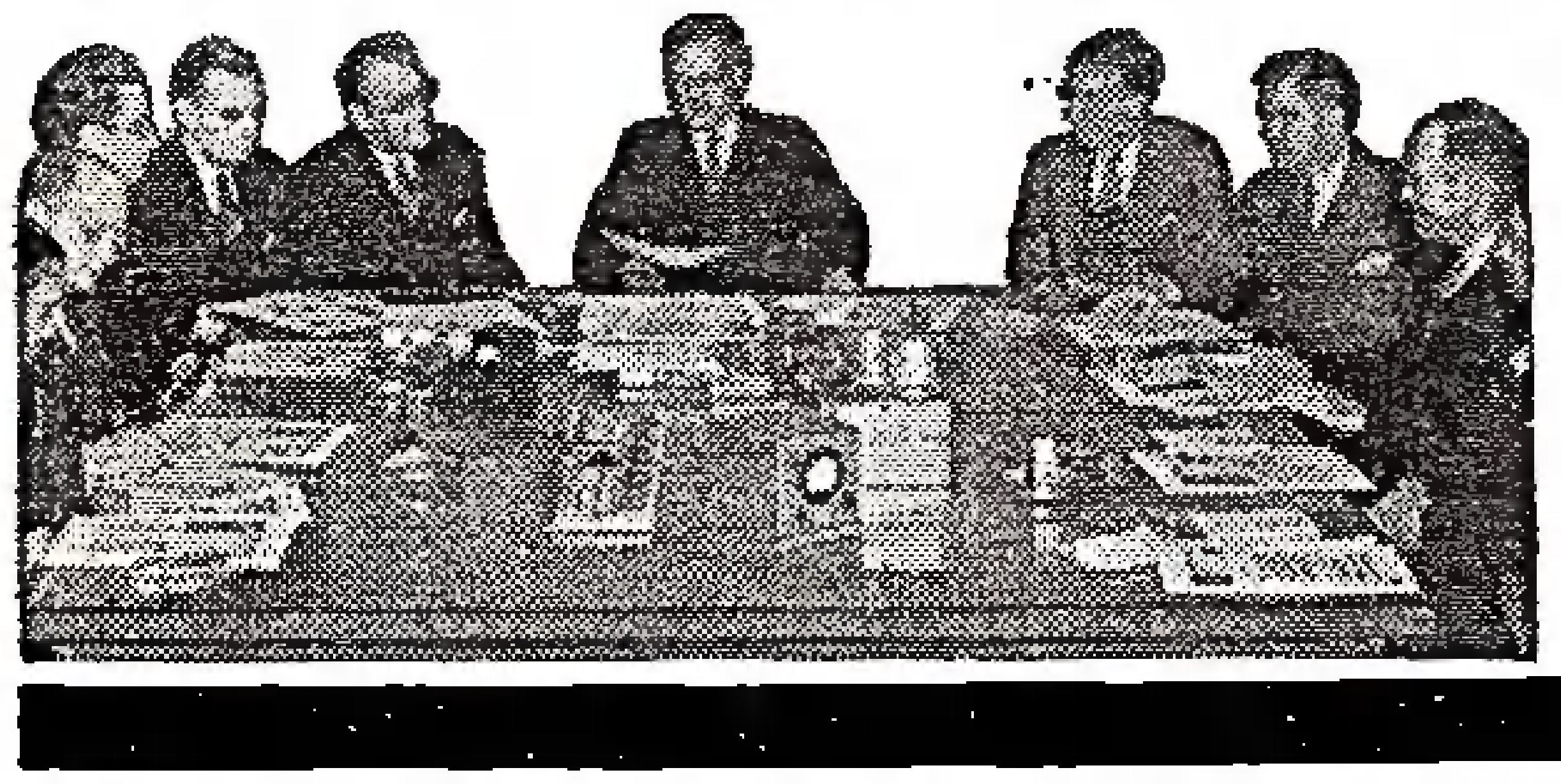

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How would you improve your home? Modern Mechanix and Inventions offers $500 in prizes for home improvement ideas.

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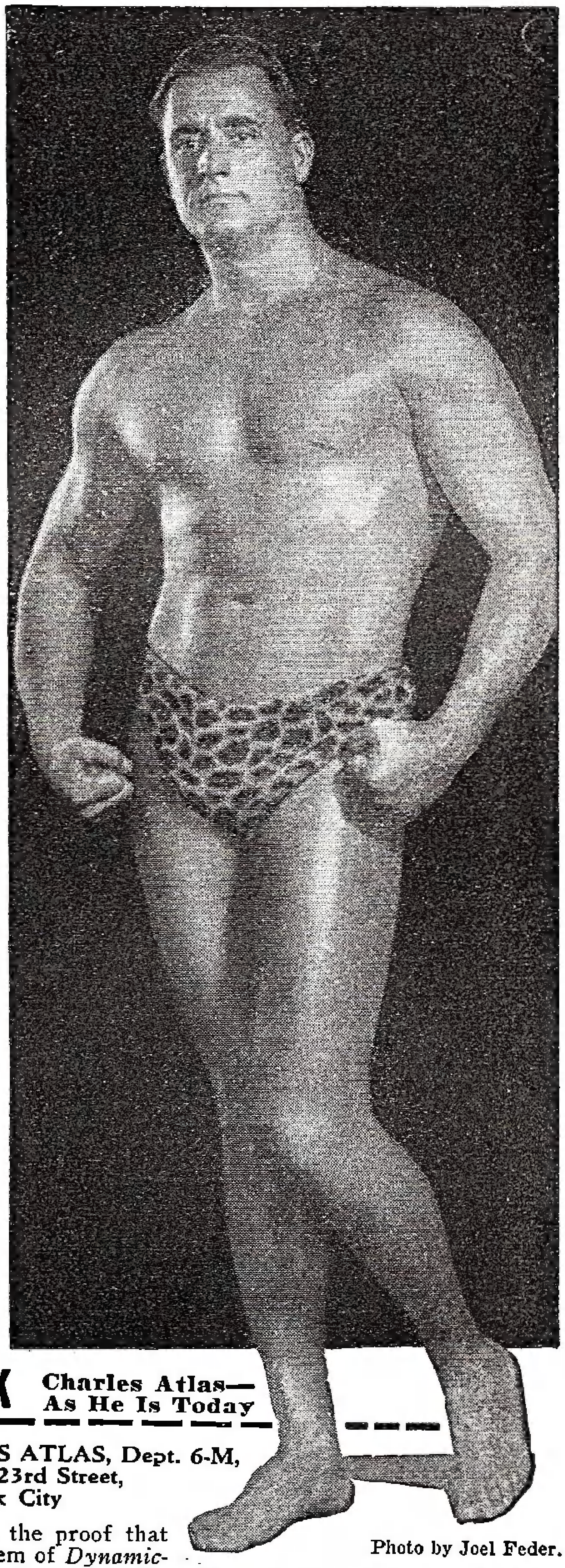

Charles Atlas—As He Is Today

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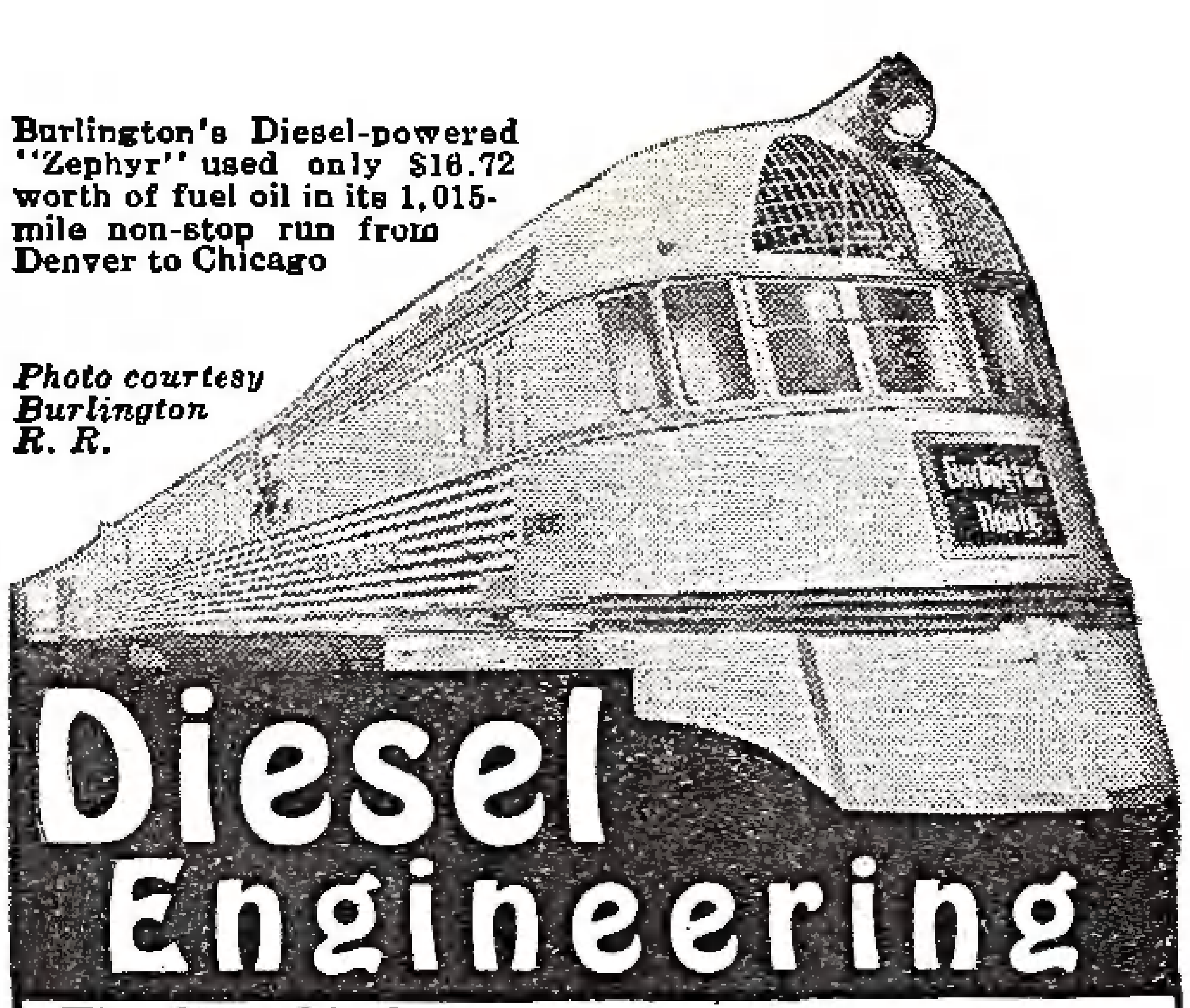
Photo courtesy Burlington R. R.



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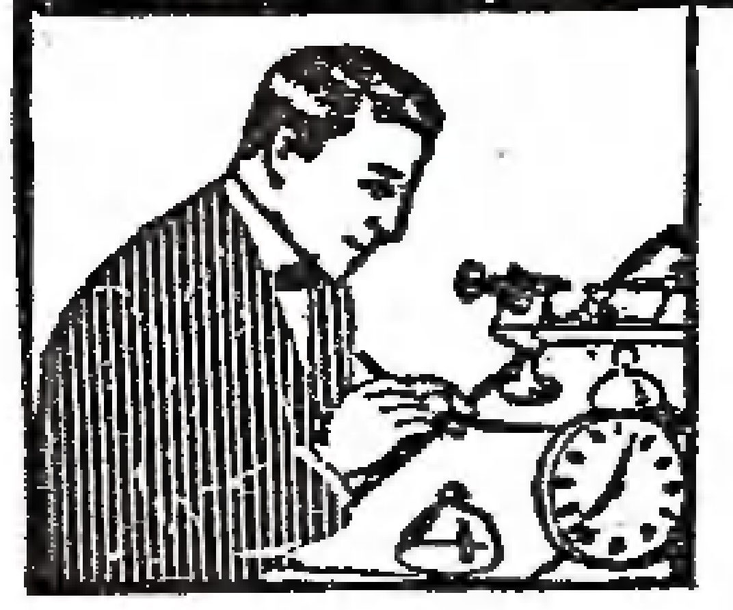

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The only man who could talk to the Superintendent

For several years, he was just like a score of other men in the plant—a good, honest, fairly capable worker, but only that. There was nothing distinctive about him or his ability—nothing to make him stand out from the crowd—no reason, as a matter of fact, why he should ever receive a raise.

Then one fortunate day he decided that the reason he wasn't getting anywhere was because he lacked special training. He searched around a bit—asked a great many questions—and then enrolled for a home-study course with the International Correspondence Schools.

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"I certainly was glad then that I had decided to study in my spare time. For, thanks to my I. C. S. course, I was the only man in the organization who could talk to the superintendent in his own language. As a result, I was promoted over men who had been here from ten to twenty years.

What are *you* doing with the hours after supper? Can you afford to let them slip by unimproved when you can easily make them mean so much?

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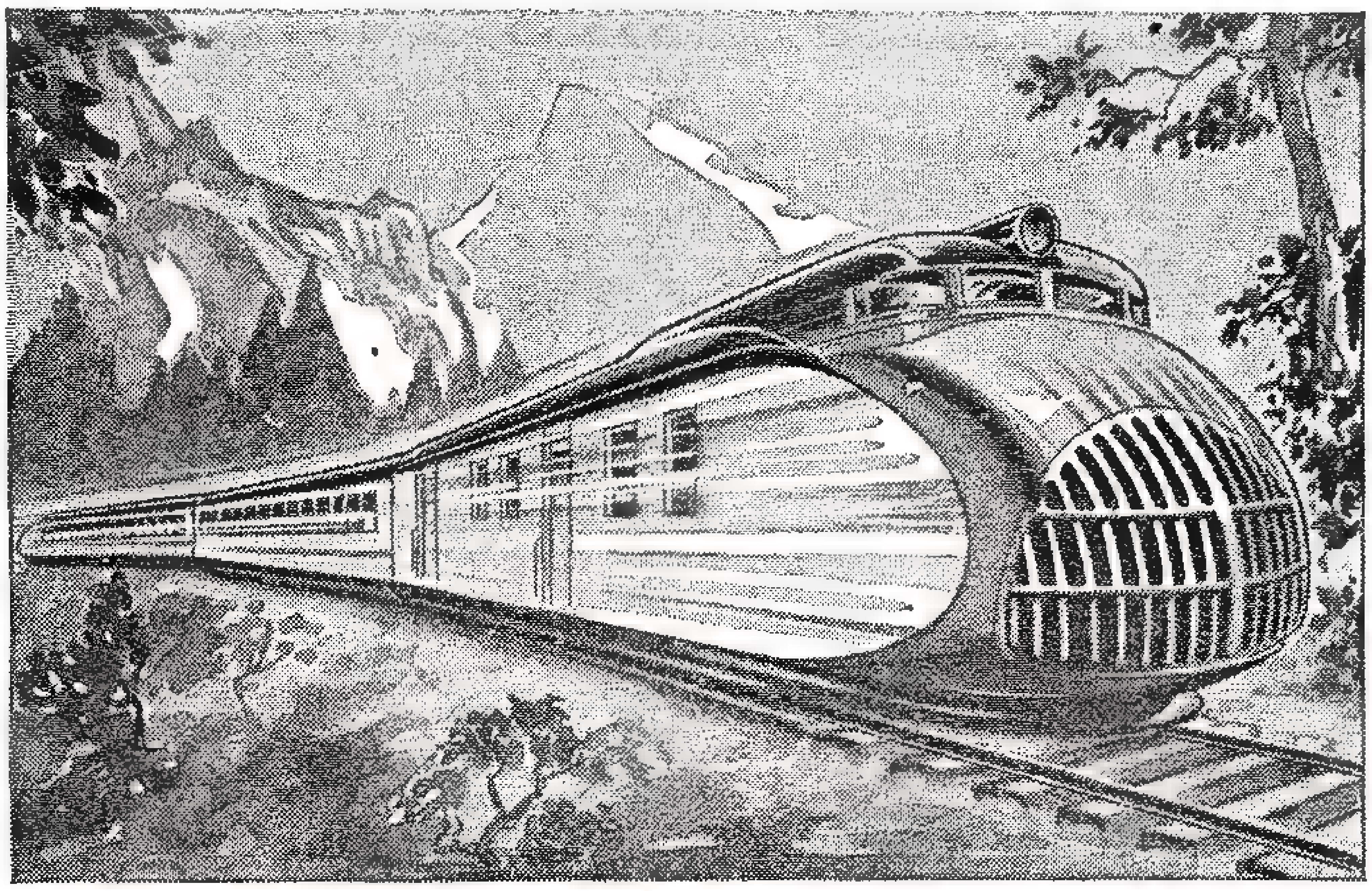
The Book Opposite Contains

48 PAGES OF FACTS FOR

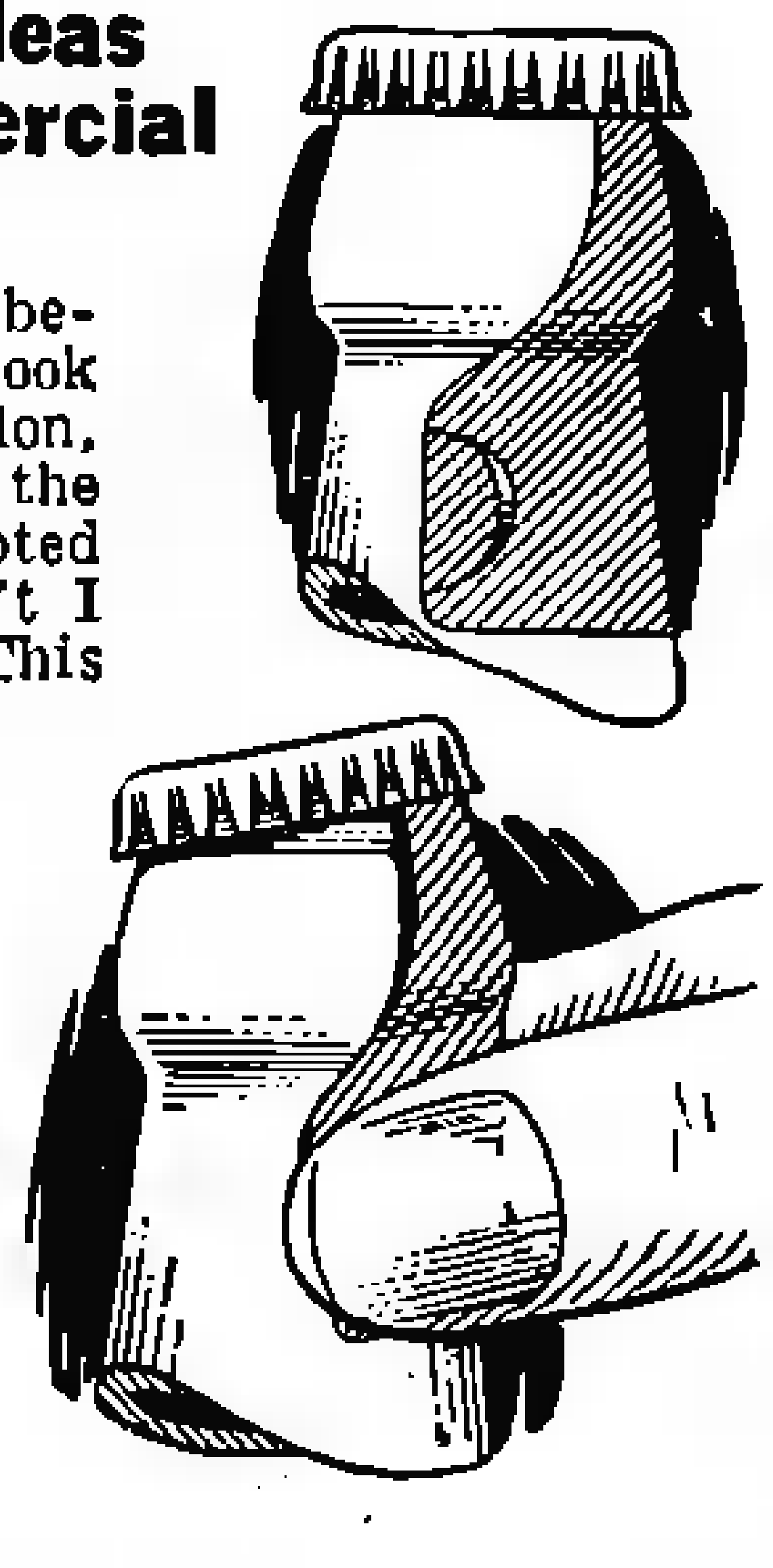
HAVE you an invention—or an idea for one—that will save time, save labor, make money or give pleasure? If you have, **this interesting, new FREE BOOK, was meant for you.** It's crammed full of practical, useful information that the man with an invention needs to know. Tells you facts like these: How the Patent Laws protect you and why, if you have an invention, you need a Patent at all; what a competent Patent Attorney can do for you; what kind of a sketch or model is needed; how to make a disclosure of your idea right away, to help establish your claims; **how some successful inventors have secured financial assistance;** tells about interesting inventions that have proved successful and shows you **115 different mechanical principles that inventors have used in working out ideas;** also gives much other information that every man who has an invention—large or small—can use to his advantage and profit. Read what the inventors below say about this book. Then, if you have an invention yourself—even though it is still in the rough or crude stages—write us for a copy. **Our business is to help you if we possibly can. You'll welcome a book of facts like this.**

The Big Age of Invention Is Still Ahead

Below is one of our newest trains. It's the crack, streamlined express of the Union Pacific. Does 110 miles an hour. The whole train weighs only as much as a single, modern steel pullman car. This is only a glimpse of what's ahead. Experts say that within the next ten years the railroads will have to be revolutionized. Henry Ford says that we're still living in the stage coach age. C. F. Kettering, Vice President of General Motors, says: **"We're only entering the great period of inventive advancement."** Look around you. Every line of industry, every sphere of life, presents opportunity to the inventor. Ten years from now, you'll see a different world; a world in which the inventor has made big changes, changes just as revolutionary as this streamlined train is today. Men who are poor today will be big financial successes a few years from now, because of inventions.



Many Little Ideas Have Big Commercial Possibilities



In contrast to the train below, a big development, look at this recent invention, which is so simple that the average person is prompted to say: "Now, why didn't I think of that myself?" This invention is nothing more than a little metal strip, curved to fit partially around the neck and under the cap of an ordinary ginger ale or beer bottle. When pulled out at the bottom, it forces off the cap, rendering a bottle opener unnecessary. A worth while improvement and the inventor has a patent. Simple, but it has in it the possibility of tremendous sales and profits. An invention needn't be complicated to be valuable. **Your first step, if you have an invention, is to get the facts about Patent Protection. We'll gladly supply them FREE to serious, interested men.**

WHAT INVENTORS SAY:

One inventor writes: "I want to compliment you on the publication of a book so replete with information naturally of great interest to inventors."

Another writes: "Your book sure is a wonderful guide for an inventor. I shall keep together the book and all references to have same on hand."

Still another man says: "I have read your book Patent Protection thoroughly and I feel sure that whenever the need of information arises I will know how to proceed in order to patent any device that I may happen to think of."

INVENTORS

WHO ARE INVENTORS?

Some of the most successful inventions have come from men who didn't consider themselves inventors at all. A dentist invented the stock ticker; a bank clerk the hand-camera; a school teacher the telephone, and a farmer invented the typewriter. No matter who you are or what you do, if you have an idea for an invention that will serve a useful purpose, you are entitled to your just reward and the Patent Laws are designed to protect the poor man and the rich man alike. But you must know how to take advantage of them. Our book will tell you how.

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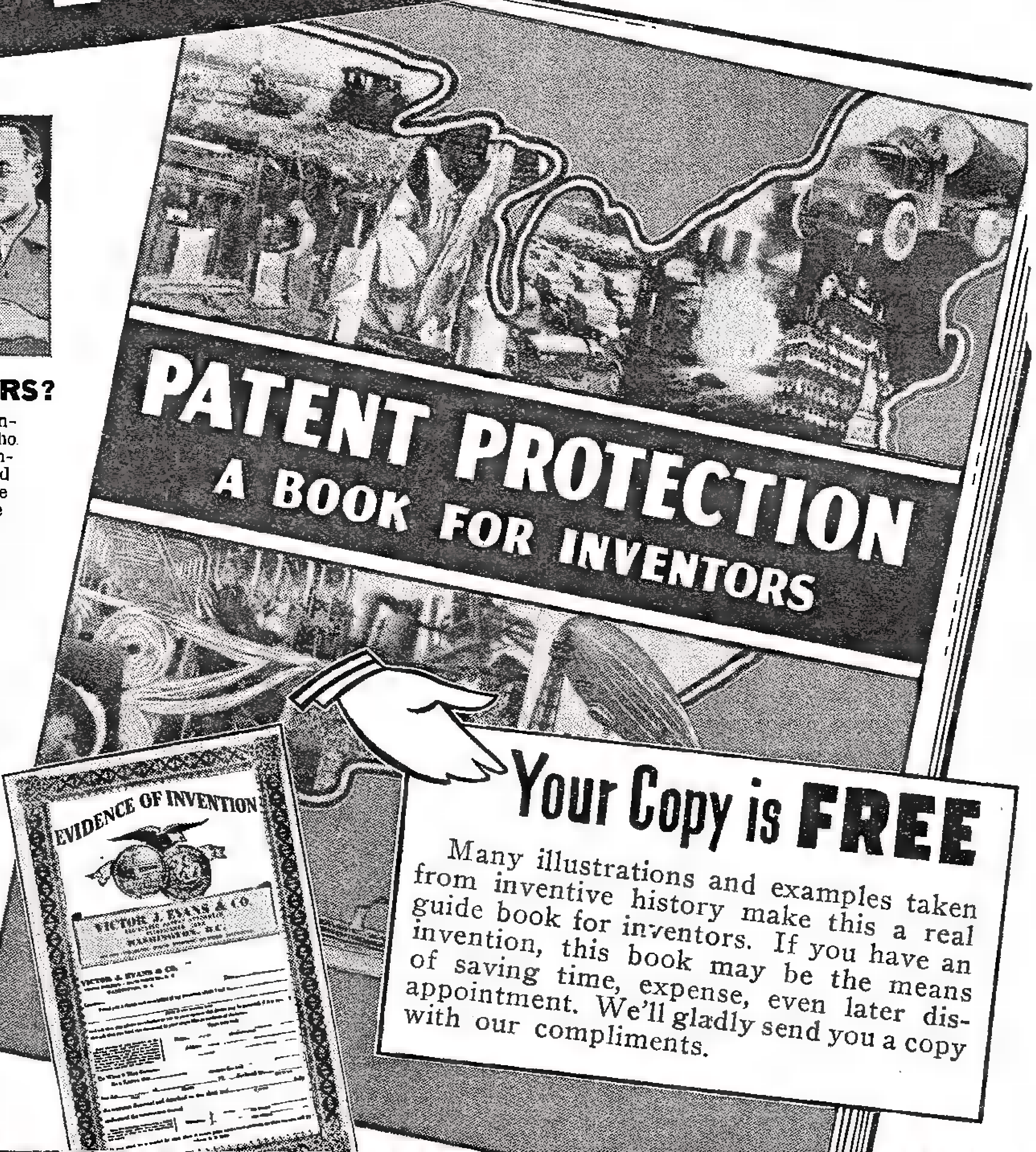

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Many illustrations and examples taken from inventive history make this a real guide book for inventors. If you have an invention, this book may be the means of saving time, expense, even later disappointment. We'll gladly send you a copy with our compliments.

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Arc welder problems and other questions cleared up for readers.

BUILDING THE ARC WELDER

Here are some questions regarding the arc welder described in the October issue. In the Dodge generator fields there are two windings—starter of heavy flat wire and generator or inner coil of round wire. Are the starter windings removed and discarded? How many turns are needed in winding the special shunt coils? How many for the insert coils? What horsepower engine is needed to drive the generator? What r.p.m. is necessary for output of 80 amperes?—E.C.K., Greenfield, Mass.

Will you please let me know in what year the G or GA Dodge generators were used?—S.A.A., Los Angeles, Calif.

Field coils on two of the generator poles are discarded entirely and new shunt coils, wound as described in the article, are substituted. On the other two, the inner coils are discarded, while the outer or starter coils are retained. New insert coils, each containing 1 lb. 21 S.C.E. wire, are slipped under the starter coils to replace the old insert coils. As stated, the number of turns is not important. It is common in welding generators to have poles of same polarity.

A 1½ h.p. electric or gasoline engine is the smallest which can be used with this direct current welding generator. Use belt and pulleys which will develop a generator speed of 1800 r.p.m. at no load for an output of approximately 80 amperes.

The G or GA generators recommended were used on the Dodge from late 1916 to 1926.

* * *

RECOVERING SILVER FROM HYPO

Is it possible to recover silver from photographic hypo fixing baths?—J. F. B., Baltimore, Md.

It is possible, but not practical, for amateurs to recover silver from hypo. Precipitants, purchased from photographic supply dealers, are put into the hypo. These collect the silver and are then sent to refineries.

* * *

VARYING RADIO VOLUME

When lights are switched on in my home the radio volume increases. When they are turned off, it decreases. How can this be corrected?—E.S.C., Chicago.

Electric house wiring often acts as an antenna. When the lights are switched on the length of the antenna is increased and the radio volume becomes greater. The solution is a good antenna, shielded so that it will not pick up energy from wiring.

* * *

LINING FOUNDRY FURNACE

Is there a more durable material than fire clay that can be used for the lining of forges and foundry furnaces?—C.K.R., Los Angeles.

The following mixture dries hard and will prove exceedingly strong once it has been glazed by the fire. By volume take 20 parts fire clay, 20 parts cast iron turnings or filings, 1 part common salt, and ½ part sal ammoniac. Thoroughly mix the materials, then add water to the consistency of common mortar and apply with a trowel.

* * *

MAKING HECTOGRAPH GELATIN

Tell me what material to use to refill my empty Hectograph gelatin duplicator.—H.N.C., Canyon, Calif.

By weight, melt 1 part clean glue, 2 parts water, and 4 parts glycerine. Heat the mixture adding glue or glycerine until the proper consistency is reached. This can be determined by allowing a portion to cool.

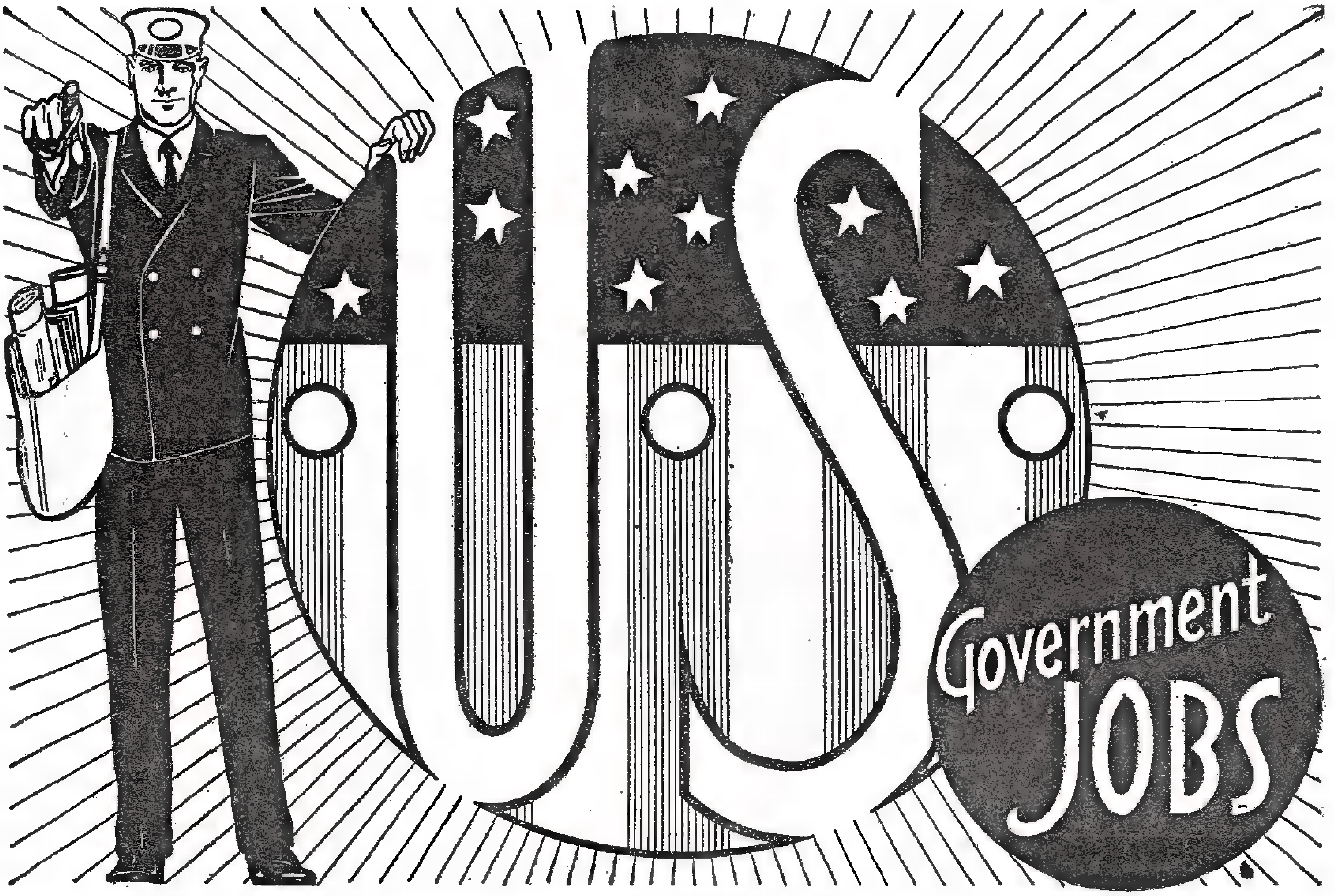
* * *

PREVENTING FROZEN PIPES IN HOUSE

What procedure should be followed to prevent freezing in the plumbing when a house is unoccupied during the winter?—R.E.H., New York.

Shut off the main supply valve. Open all faucets and drain outlets. If there are no drain outlets, disconnect the supply pipe at the main supply valve to drain off all water under the lowest outlet fixture. Disconnect pipes that do not have sufficient slant to drain off water. Empty all flush boxes. Add kerosene or other oil to water in all traps to prevent freezing, avoid evaporation and the admission of sewer gas into the house.

(Editor's Note—All letters sent to this department should include a stamped, addressed envelope. Write to M-M Problems Editor, 529 So. 7th St., Minneapolis, Minn.)



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Railway Postal Clerks—Post Office Clerks—City Mail Carriers—Rural Mail Carriers—General Office Clerks—Liquor Gaugers—Bookkeepers—Customs Inspectors—Immigrant Inspectors

A VERY DESIRABLE POSITION

Railway Postal Clerks get $1900 the first year regular, being paid on the first and fifteenth of each month, $79.16 each pay day. Their pay is increased $100 and $150 a year. The maximum is $2700 a year, $112.50 each pay day. They get extra allowance for hotel expenses when away from home.

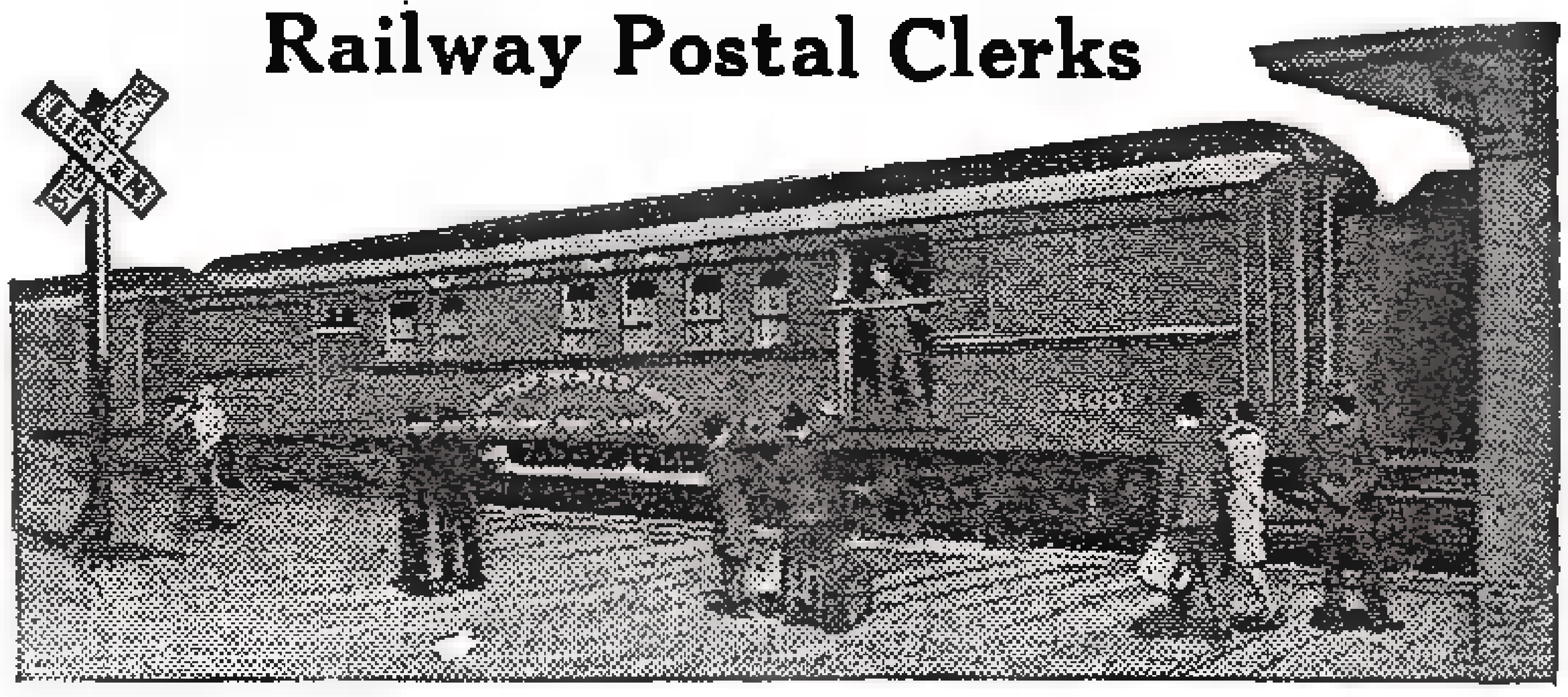
PAID VACATIONS

Railway Postal Clerks, like all Government employees, are given a yearly vacation of 15 working days (about 18 days). When on long runs they usually work 3 days and have 3 days off duty or in the same proportion. During this off time and vacation, their pay continues just as though they were working. When they grow old, they are retired with a pension. As Railway Postal Clerks are continually traveling, they have an excellent chance to see the country. They are furnished with a railroad pass for official business.

City Mail Carriers—Post Office Clerks

Clerks and Carriers get $1700 the first year regular and automatically increase $100 a year to $2100, with further increase to $2300. They also have 15 days' vacation.

Railway Postal Clerks



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☐ Customs Inspector	(Start, $2,100)
☐ Bookkeeper	(Start, $1,440)

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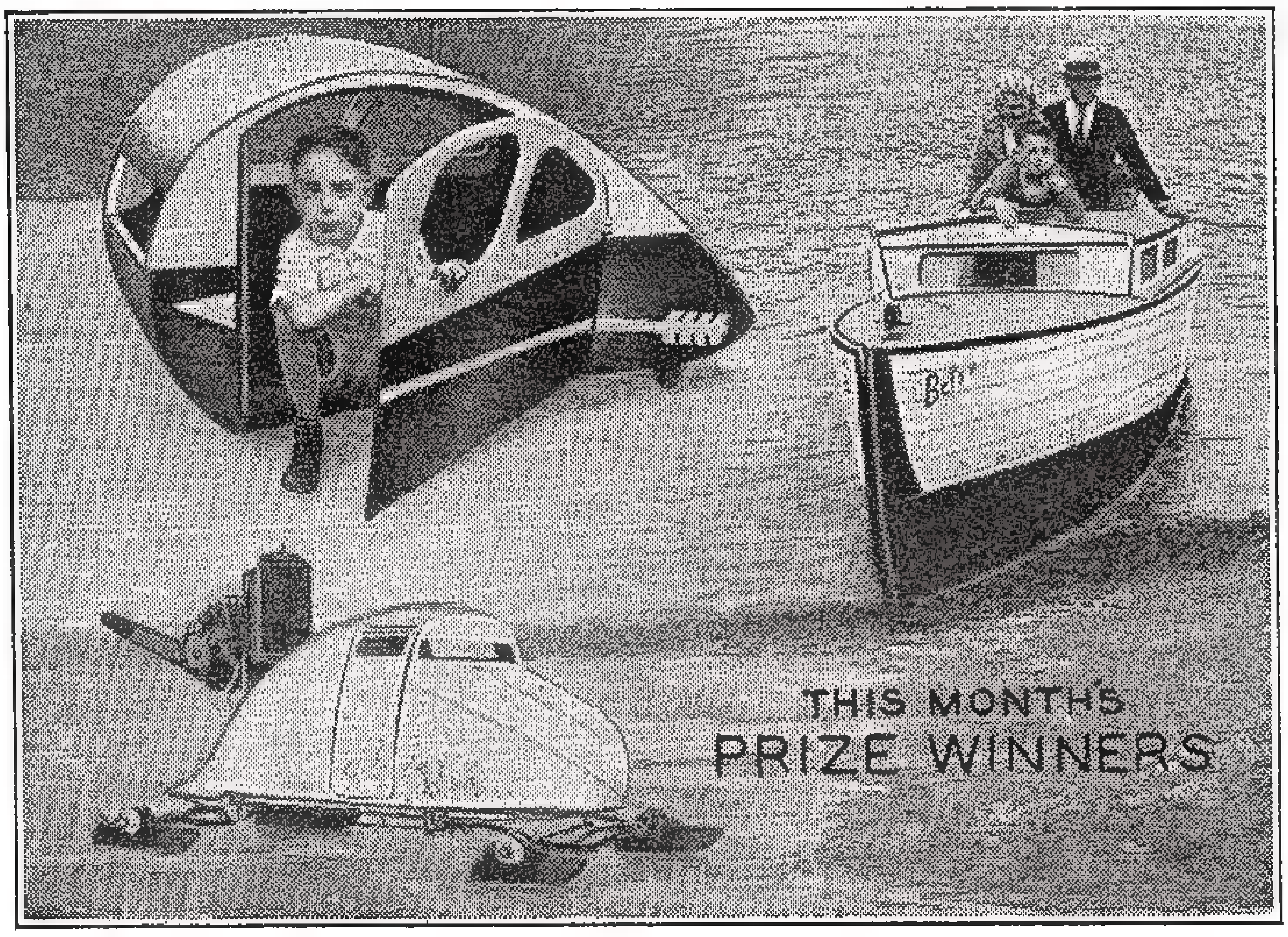
Use This Coupon Before You Mislay It—Write or Print Plainly.

Random Chips from



Jack G. Moody won first prize of $5.00 for the photo of his Scooter (top left). Second prize went to Jack B. Major for the Lark Jr. he built for $12. It is shown at right. The streamlined motor ice sled brought third prize to W. R. Davison.

Big $500 contests open to all MM readers. Here are some new members of MM's boat fleet. Scooter wins first prize in Workbench contest. MacRobertson, Australian millionaire, sends letter and photo.

EVERY shop fan, handy man, and home lover should enter MM's new $500 cash prize contests. We haven't room to discuss details here, but we know every one of you has a good chance of winning one of the 56 prizes. Announcement and rules for the first of a series of four contests can be found on page 46.

* * *

In the Workbench's own little contest, prizes this month were awarded to three good examples of fine workmanship. First prize of $5.00 goes to Jack G. Moody, the first reader to send in a photograph of the Scooter, which was explained in a how to build article in the August issue. Moody says:

Akron, O.

Dear Editor:

The scooter, planned for the small boy next door, was built from the plans in the August M.M. It is painted silver and vermilion with a half inch black line separating the two colors. The arrows and striping were first cut from gummed paper, painted and then glued on, making a professional looking paint job. The construction cost amounted to only seventy-five cents. And is the little boy proud of it!

Jack G. Moody.

Another Jack, this time Jack B. Major, received second prize of $3.00 for his photo and letter. For $12 he built Lark Jr., the 13½-foot outboard motor powered cabin cruiser, plans for which appeared in the October, 1933, issue. Here's his letter:

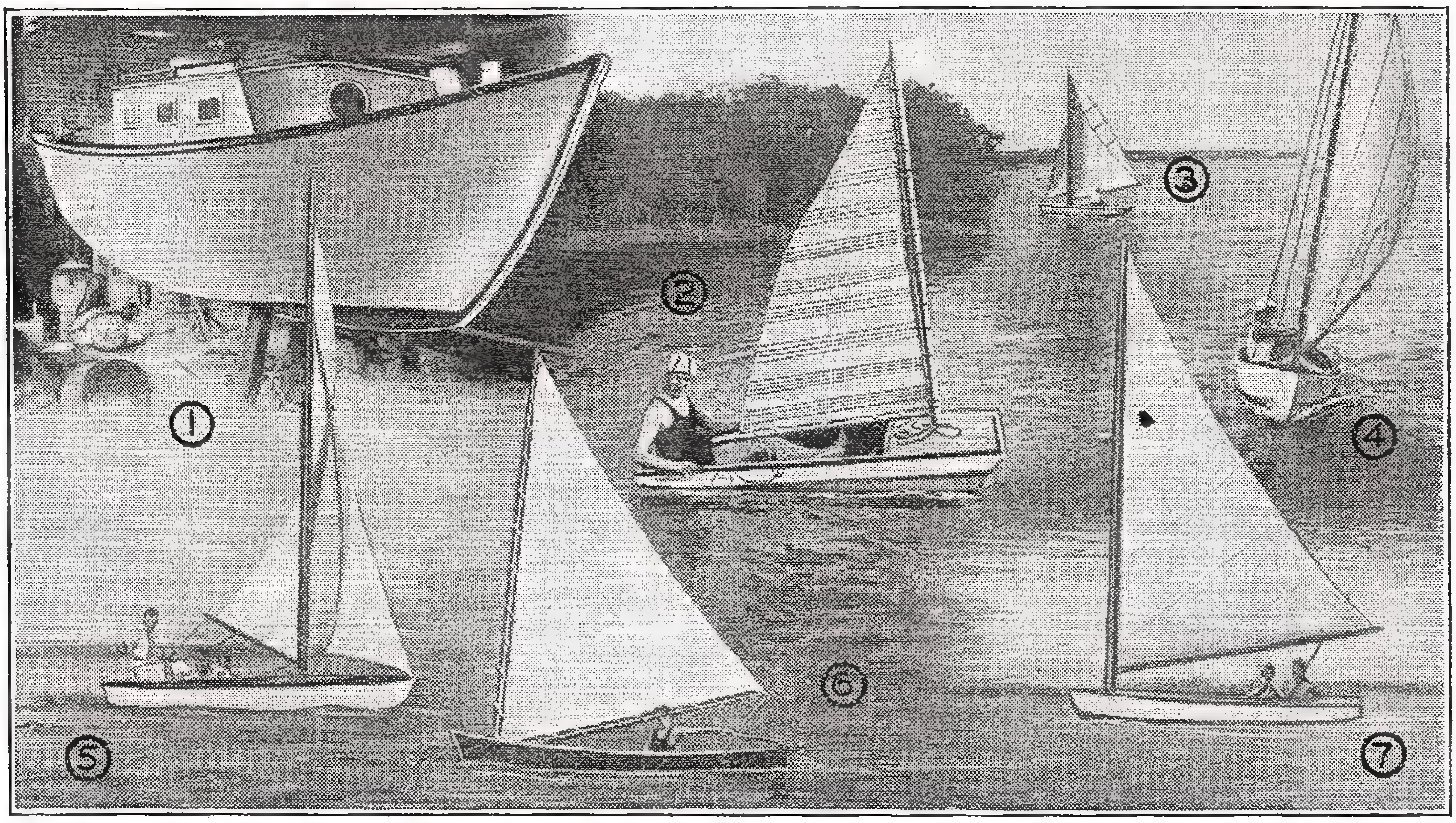
Little Rock, Ark.

Dear Editor:

I am sending you some snaps of Lark Jr. I built it last spring. It shows you what a

A letter from MacRobertson (above), Australia's cocoa magnate, complimented our Sept. MM story on the London-Melbourne air race he sponsored. Photo shows first prize.

the Editor's Workbench



MM's BOAT FLEET has these new members: 1. S. T. Dickinson's "Dorothy"; 2. Chas. H. Peer's "Sea Skeeter"; 3. L. R. Healy's "Sunray"; 4. Sergt. R. Glenn's "Tar Baby"; 5. Frank K. Owen's "Sunray"; 6. Fred Kahs' "All Sorts"; 7. Joseph Bus' "Monotype." Send your boat photos and join the fleet.

> man can do with good old MM and twelve bucks. That is what it cost me less the motor. She will do eight to ten miles an hour right along.
>
> Jack B. Major.

Blueprints for this midget cabin cruiser are now available for $2.00.

* * *

With the ice season right on our heels we couldn't resist giving third prize of $2.00 to Wallace R. Davison's excellent photo of his streamlined ice sled. He tells us:

> Minneapolis, Minn.
>
> Dear Editor:
>
> I am sending you a picture of my streamlined ice sled which I built up out of an old Chev. chassis and reinforced with an X. It is powered with a supercharged Star motor and will do 60 miles an hour. Brakes, steering wheel, and spring mounted runners give the riders a floating ride with comfort and safety at all speeds. Wheels are interchangeable in place of the runners and it can be taken wherever I wish.
>
> Wallace R. Davison.

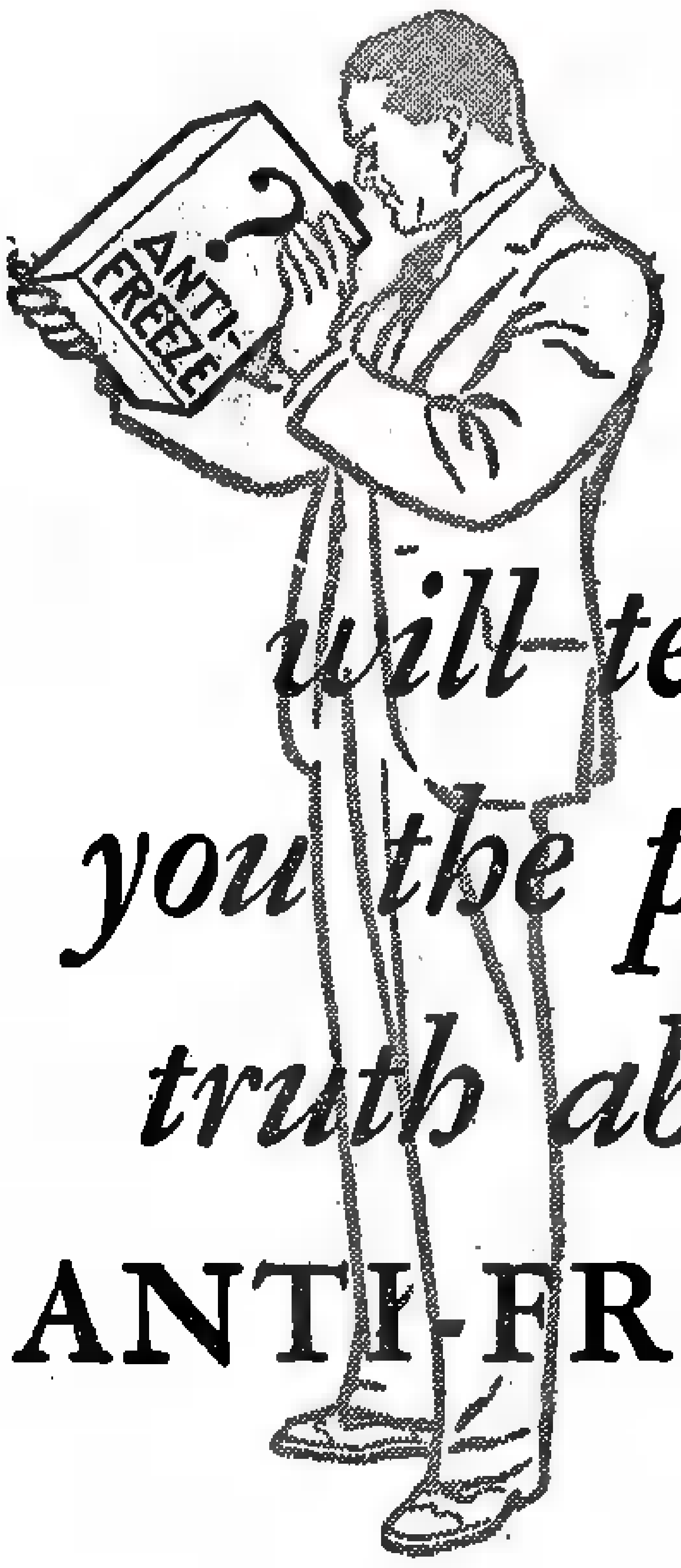
* * *

MM's boat fleet continues to grow in numbers and popularity. Every month we receive several letters and photos from appreciative readers who have built and are pleased with MM's boats. A few of the photos are grouped in the composite picture above. If we had space we'd quote all enthusiastic letters. Here are some excerpts: Frank K. Owen, St. Paul, Minn., says about his "Sunray"—"**Had a great time sailing her. She handles very well.**" Joseph Bus, Hamtramck, Mich., about his "Monotype"—"**It is easy to handle and will outsail anything with the same sail spread or length of hull.**" S. T. Dickinson, Evanston, Ill., about his "Dorothy"—"**She is a dandy little job. Powered with a Universal Flexifour 20 h.p., she makes about 10½ m.p.h.**" Charles H. Peer, Maplewood, N. J., about the "Sea Skeeter"—"**She has been on most every lake and stream in New Jersey. Every time we go on an outing Sea Skeeter is perched on top of old Lizzie and goes with us.**" L. R. Healy, Yarmouth, Nova Scotia, about "Sunray"—"**Had a great deal of fun and pleasure building and sailing her and found your plans easy to follow.**" Fred Kahs, Prince Bay, New York, about "All Sorts"—"**This was my first attempt at boat building.**" Sergt. R. Glenn, Rizal, Philippine Islands, about "Tar Baby"—"**She sure is a honey. Rough water, surf and wind, she takes them all nicely.**"

* * *

Every month the Workbench awards three prizes for the best photos, accompanied by interesting letters, of the models, furniture, radios, boats, etc., built by MM readers. What have you to offer?

The
"NOSE-TEST"



will tell you the plain truth about ANTI-FREEZE

From the standpoint of evaporation there are two kinds of anti-freeze—the kind that boils away and the kind that does *not* boil away. There is no middle ground. Some boil-away anti-freezes, however, have been "treated" to "decrease evaporation," and many car owners may get the impression that such products are all-Winter, one-shot, non-evaporating anti-freeze. Such an impression would be wrong. For such anti-freezes boil off rapidly when the engine is operating at high speed. An easy way to make sure that you get an all-Winter, one-shot product is by the lack of odor. Eveready Prestone is absolutely odorless—all boil-away anti-freezes, on the other hand, have a noticeable odor.

Guaranteed All-Winter Protection

Don't confuse Eveready Prestone with either glycerine or alcohol. Eveready Prestone is a one-shot, guaranteed anti-freeze, that will not boil off. And Eveready Prestone is also your best defense against rusting and corrosion in your car's cooling system. It protects against rust from 5 to 20 times longer than other anti-freezes.

Play Safe—Save Money

It costs very little to have the guaranteed protection against freeze-up and rust provided by Eveready Prestone. On Page 27 [illegible] a chart, showing exactly how much is needed to protect *your car*. Also on that page note the Eveready Prestone guarantee.

TURN TO PAGE 27

Your 2nd Chance

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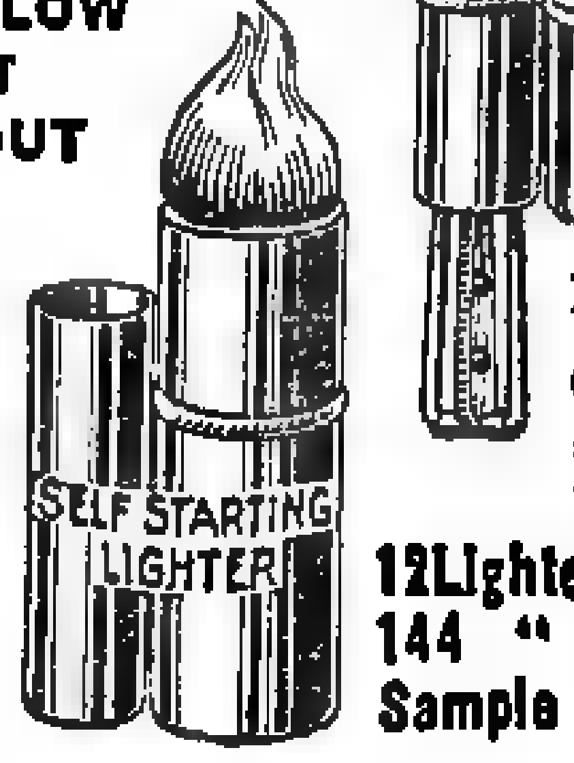
Cleveland, O. Kansas City, Mo.



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This New scientific marvel amazes everyone. LOGICAL SUCCESSOR TO THE FLINT LIGHTER. No flint---no friction---a brand new ignition principle. Every demonstration a sale. Retail at 25c. Sample nickel plated with moneymaking sales plan 25c. Gold, silver or chromium plated sample 75c. AGENTS—Get details on this moneymaker.

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12 Lighters $1.75
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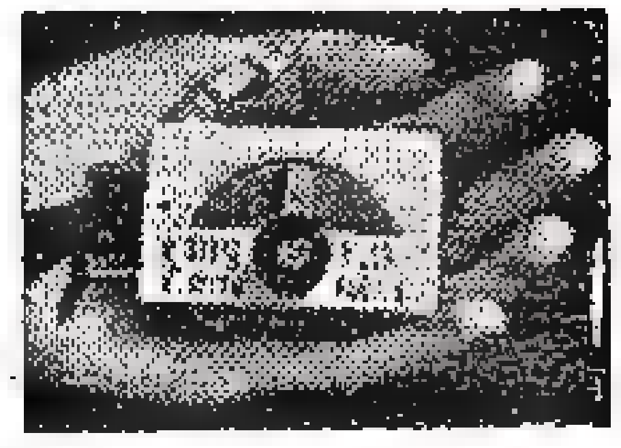
Sample . 25c

NEW METHOD MFG. CO.
Desk M-24 New Method Bldg., Bradford, Pa.



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Can actually be carried in pocket or purse! No tubes—batteries—nothing to wear out. Simply clip to ANYTHING made of metal for clear toned reception! One control—gets all stations 50 to 100 miles; Short wave & police calls also! No aerial or complicated wires needed! Proven coast to coast reception in tests! Foolproof—and practical—great novelty. Can be used ANYWHERE while walking, riding, etc.! Complete with tiny phone. Nothing else to buy. Send only $1.00 and pay postman $1.95 plus postage or send $2.99 (M.O., Currency, Check). Sent p.pd., in 48 hours. Complete Ins., Included. Guaranteed. Order now!

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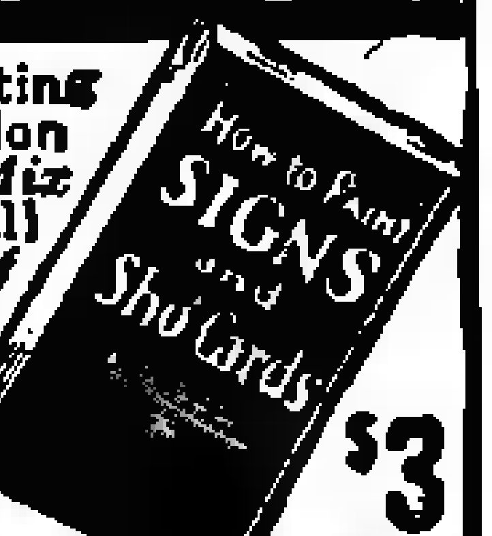
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No talent or experience necessary. Fascinating work. Pays big money. Complete instruction book *tells about:* Alphabets, Colors, *How to Mix Paints*, Show Cards, Window Board and Wall Signs, Ready made letters, Gilding, *Tricks of the Trade*, also gives 100 Alphabets and Designs. Book bound in flexible imt. leather-gold edges, and four ball bearing Show Card Pens. Sent postpaid $3.00. (C.O.D.) 10c ex.

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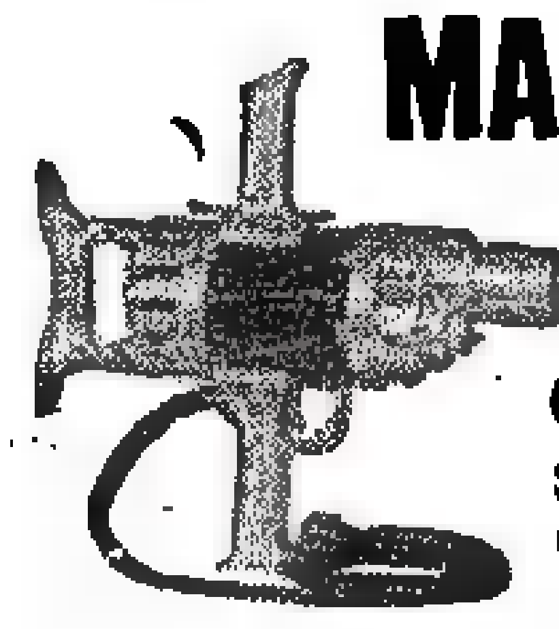

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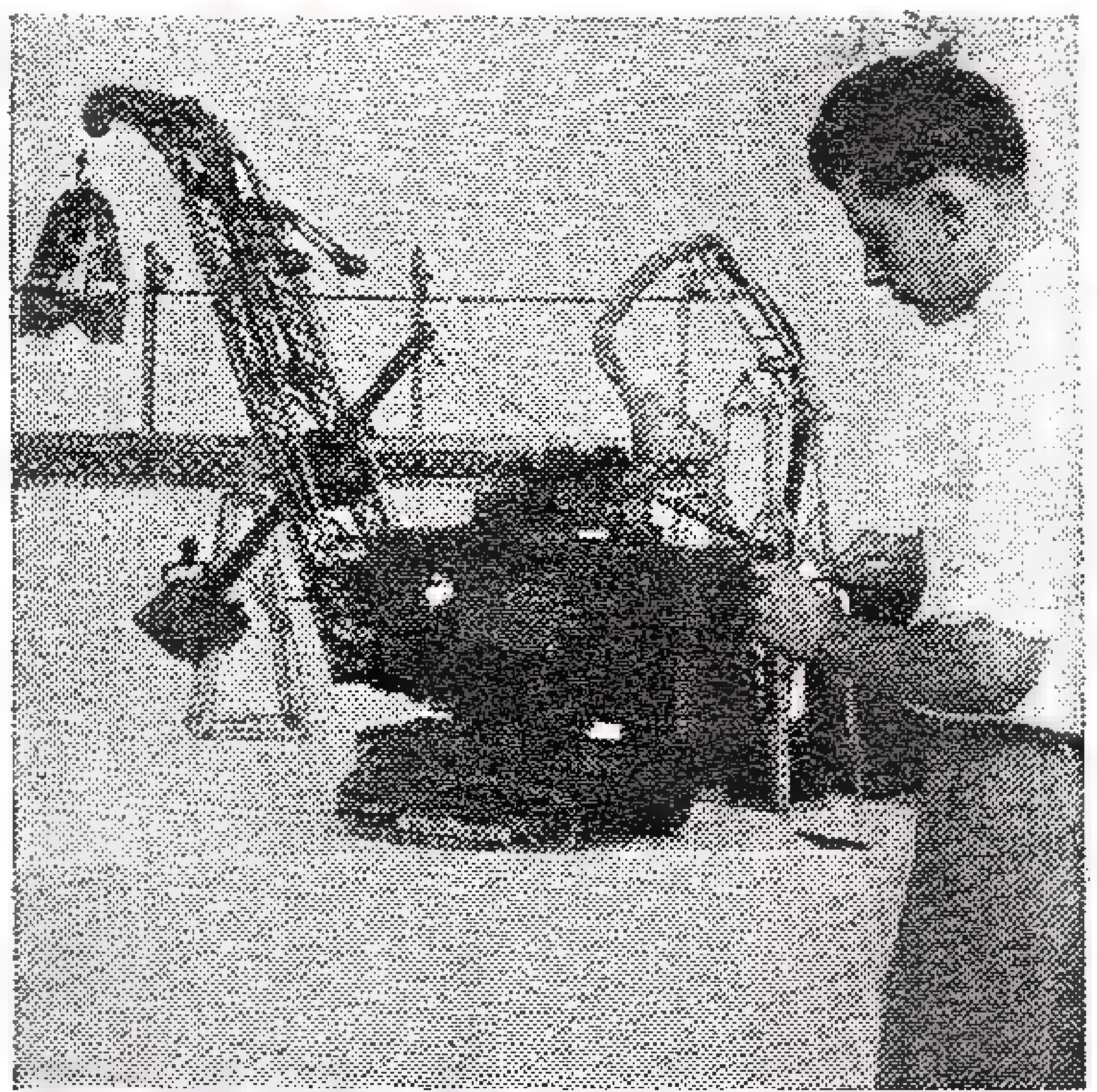
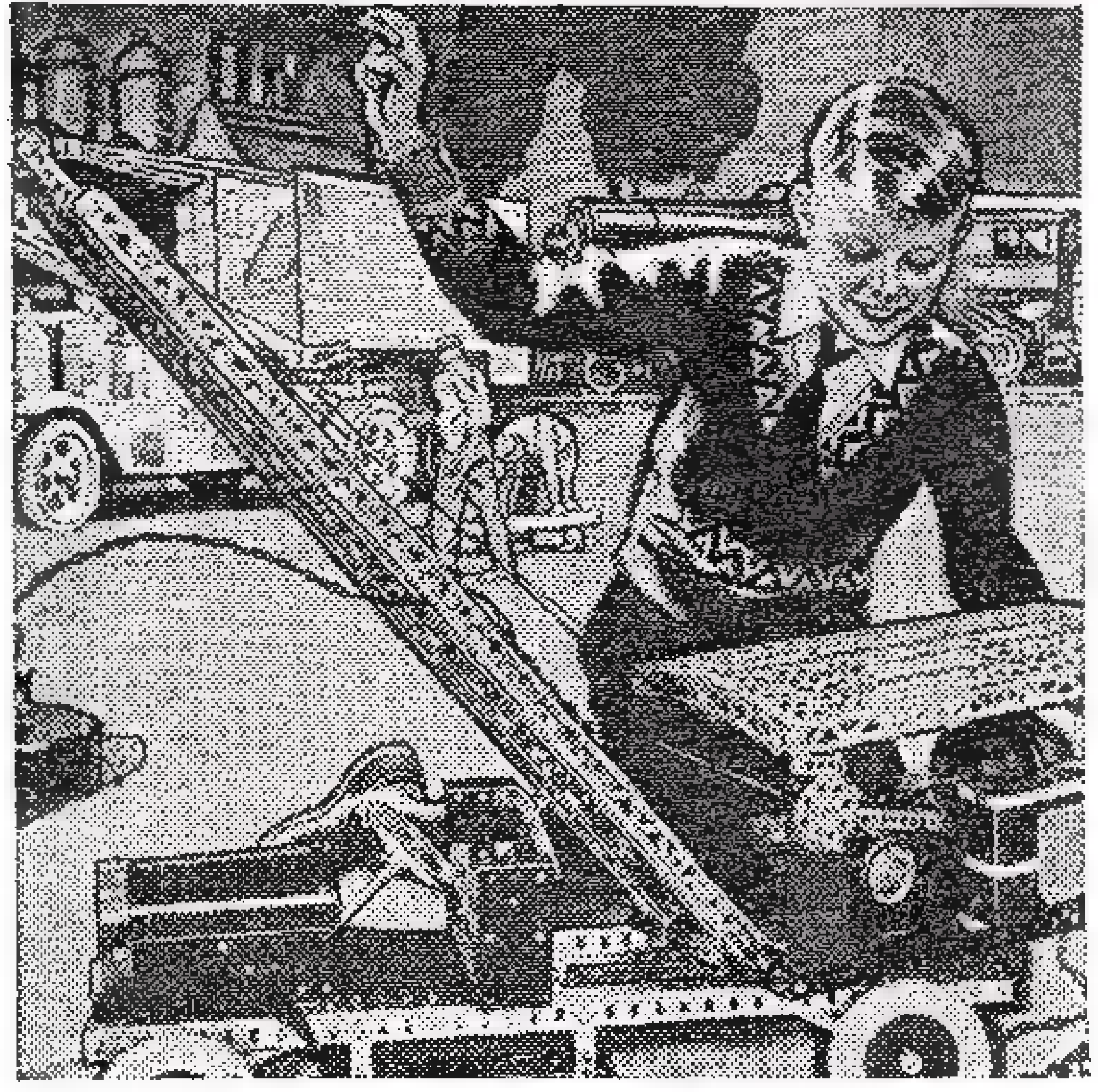
★ NOW COMES A FINER ERECTOR — AND A BIGGER PRIZE CONTEST — FREE CHEVROLET GRAND TOTAL OF 1,001 PRIZES!



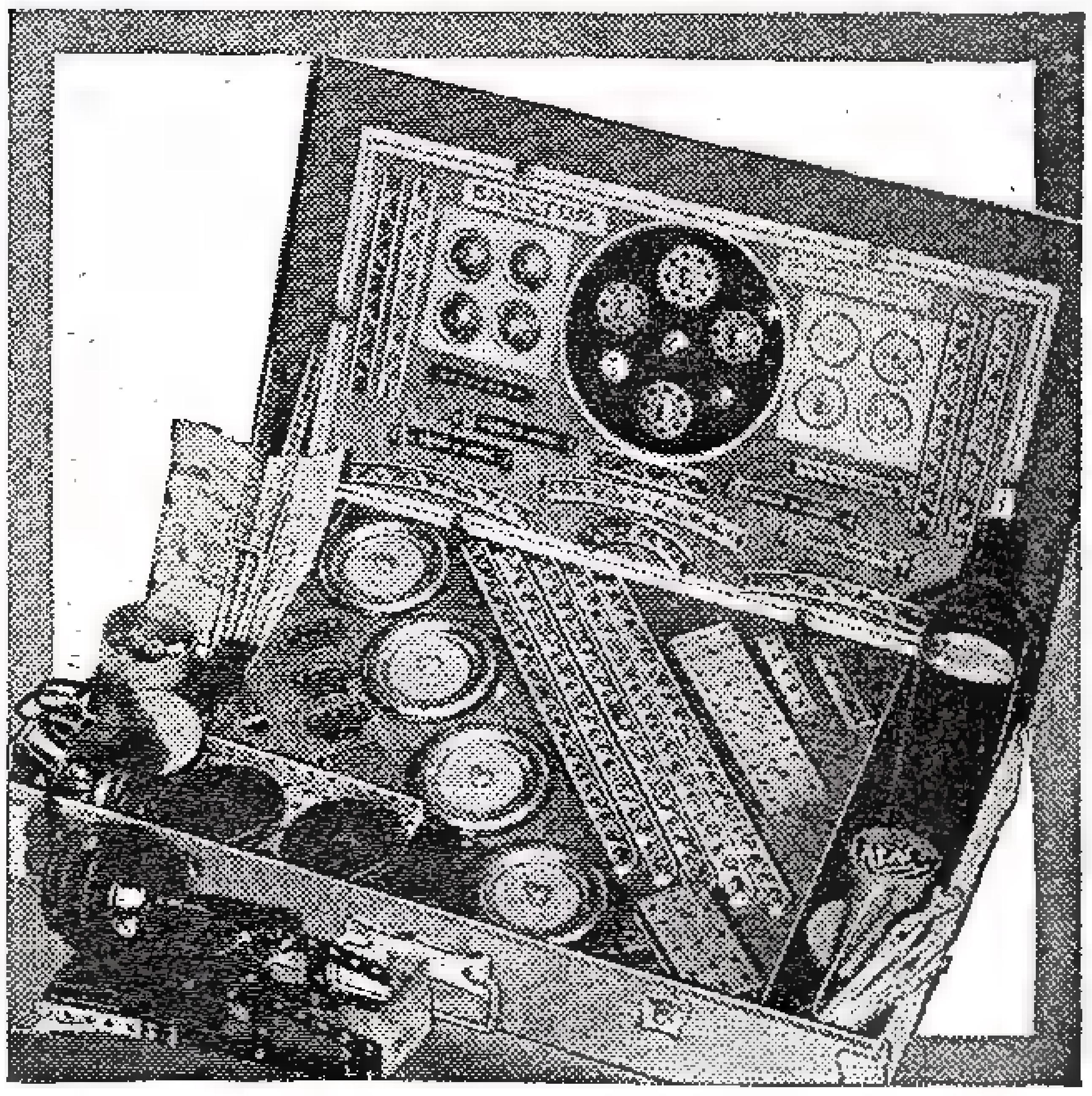
FIRST PRIZE WINNER LAST YEAR—Here is Eugene White, Jr. of West Fairview, Penna. with his marvelous model of an electric crane and shovel that captured first prize in the 1934 Erector Contest. Look! It's as big as he is. Eugene had his choice of a free trip to any place in the United States, but decided to use the money towards a college education.



YOU BUILD LIKE A REAL ENGINEER WHEN YOU BUILD WITH ERECTOR

In background, a traveling magnetic crane in a steel mill that will lift 7½ tons of metal at once.

Foreground, the traveling magnetic crane made with the New Erector No. 7½ set.



THE NEW ERECTOR SENSATIONAL NO. 7 SET—Contains the powerful Gilbert 110-volt motor, all-purpose gear box, girders, gears and other real engineering parts for building over 150 action models. Erector Sets start at $1.00. Be sure to see the Famous No. 4—the "Super-6" Erector—and the sensational No. 7.

HELLO BOYS! Can you think of anything you can own that will give you so much thrilling fun as Erector? Just listen to this.

With Erector you can build a trench digger—with a real electric motor in it—and make it work just like the ones you see on the highways. You can construct motor trucks, fire engines, aeroplanes, locomotives. Put them together—piece by piece—with your own hands. You can build drawbridges that actually open and close —a towering ship crane such as used in Uncle Sam's Navy Yards—a mighty hoisting engine—and dozens of other thrilling engineering marvels . . . Then you can hook up the powerful Erector electric motor and make them hum with action. You are a full-fledged engineer when you have an Erector—because Erector is just like real engineering.

TUNE IN "THRILLS OF TOMORROW" —Follow "Spike" Butler in his hair-raising adventures. NBC—WEAF network, Fridays, 6:00 P. M. See your local newspaper for other NBC stations.

HERE'S YOUR CHANCE TO WIN A BRAND NEW CAR OR OTHER VALUABLE PRIZE!

How Eugene White, Jr., won his exciting prize is a real, true story. Now you can do the same. This year I am having another Erector Contest—with *better* prizes than before. First prize is a Chevrolet auto. Then there are bicycles, cameras—a total of 1001 thrilling awards.

So right now, do these two things. First, mail the coupon below, and I'll see that you get my big illustrated "Look-'em-over" Book and an entry blank for the prize contest. Then go to the nearest toy store and pick out the Erector you want. Take your Dad along. He'll want to share in the fun . . . And good luck in my big prize contest.

Your friend,

A. C. Gilbert

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Send me the big colored Erector "Look-'em-over" Book and entry blank for the Erector Prize Contest—both free.

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INVENTORS

and MECHANICAL MINDED MEN

Can you answer these questions?

1. Why should an inventor secure a patent on his invention?

2. Can you name 3 inventors to whom more than 500 patents were issued?

3. Who discovered vulcanization of rubber? (2) Dynamite? (3) Lithography? (4) X-Ray?

4. Why should an inventor not attempt to obtain his own patent?

5. Can you name some inventions and discoveries which have been made independently by two or more persons?

6. When should an inventor disclose his invention to a manufacturer?

7. Need the attorney's fees in a patent matter be paid in a lump sum?

8. Does an inventor have to appear at Washington to get a patent?

9. What great invention was made out of a macaroni box?

10. What great step of progress, besides the invention of the cotton gin, is credited to Eli Whitney?

For the answer to these questions and other information of value to you, look on page 146

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He's finished high school

WHAT WILL YOUR SON DO NOW?

We're talking to parents, especially those who, regardless of present circumstances, had made no serious plans for their sons going to college after high school graduation. What we have to say will also interest parents who made plans but have seen them shattered by unforeseen forces.

There was a time when a boy could step from high school graduation into a job. The boy who does it today is fortunate indeed. The inability to do it is not always a reflection on his ambition or his ability. In many cases the job is not there.

The economic horizon is brightening—there's no doubt about that—but there are millions of trained men, with families dependent upon them, waiting to fill jobs as they materialize. All the organized forces of society and government are working to solve the unemployment problem.

At the moment it's a serious outlook—and a sad one for the boy. He is willing to work but cannot find work to do. He is at the peak of his energy and his enthusiasm. Shall he begin life in bitterness, or in brooding over his fate, or make associates and acquire habits that would have never tempted him in normal times?

Your greatest responsibility to that boy is TODAY! He needs your advice and your guidance more than he ever needed it before.

Why not, then, encourage him to devote a systematic portion of his spare time to the study of something which will engage his thoughts and—more important—give him training which will be of inestimable benefit to him in the years ahead? This study can give him a new vision of life, inspire him to greater achievements. Apprenticeship is still necessary, but employers prefer young men whose attitude and preliminary training qualify them to adapt themselves readily to the employer's needs.

The International Correspondence Schools, the largest and oldest institution of its kind in the world, have been providing ambitious men with the training they needed for over forty years. The boy just out of high school is ideally prepared for study of any of our 300 courses. If you'd like, one of our vocational counsellors will discuss—*personally*—your boy's problem with you and him. This coupon, marked and mailed, will bring complete information—absolutely free! Study the coupon—it may be the beginning of a useful career for your son.

Ralph E. Weeks

President

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- ☐ Electrical Engineer
- ☐ Electric Lighting
- ☐ Welding, Electric and Gas
- ☐ Reading Shop Blueprints
- ☐ Telegraph Engineer
- ☐ Telephone Work
- ☐ Mechanical Engineer
- ☐ Mechanical Draftsman
- ☐ Machinist ☐ Toolmaker
- ☐ Patternmaker
- ☐ Heat Treatment of Metals
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- ☐ Bridge and Building Foreman
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- ☐ Heating ☐ Ventilation
- ☐ Sheet Metal Worker
- ☐ Steam Engineer
- ☐ Steam Electric Engineer
- ☐ Civil Engineer
- ☐ Surveying and Mapping
- ☐ Refrigeration
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- ☐ Marine Engineer

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If you reside in Canada, send this coupon to the International Correspondence Schools Canadian, Limited, Montreal, Canada

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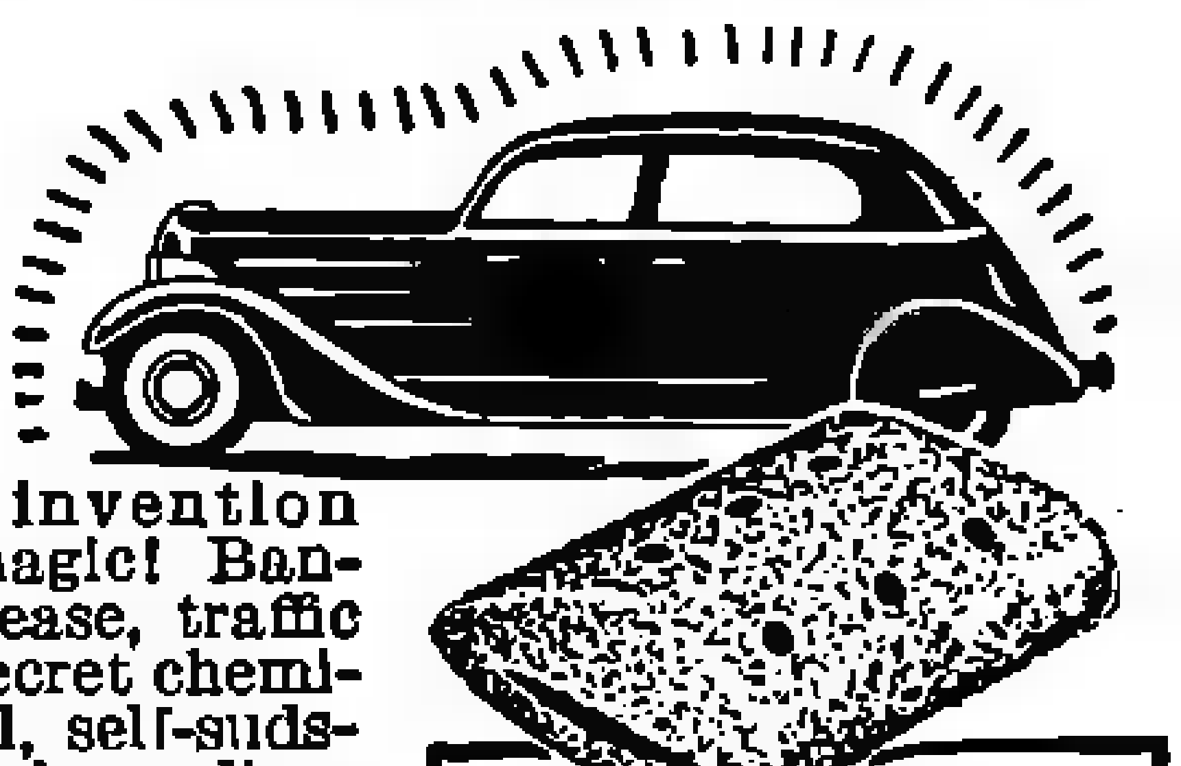

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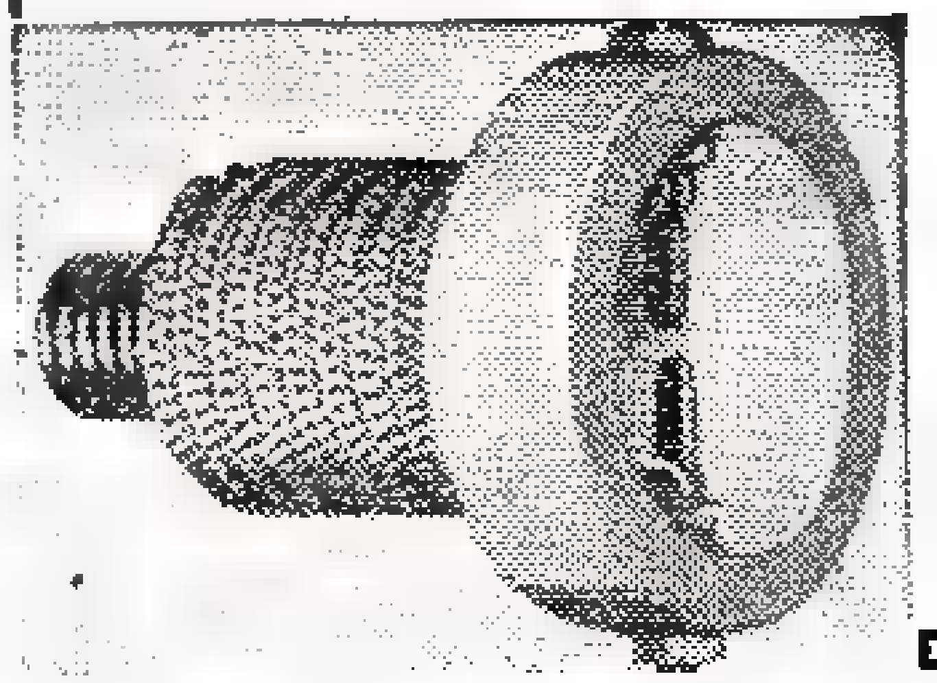

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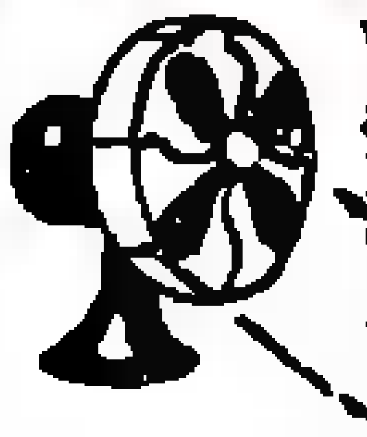
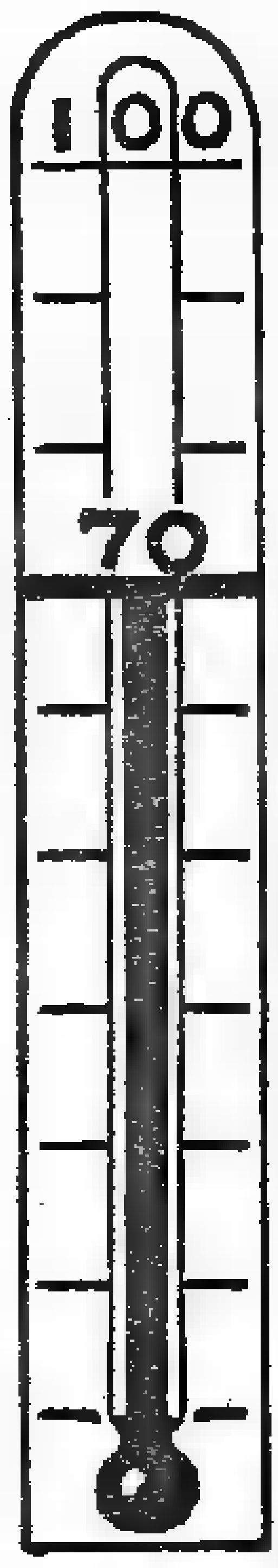


Why don't you get into this profitable new line—replacing old-fashioned heating and ventilating systems in factories, offices, homes, etc., with modern air conditioning equipment? — and planning new buildings for air conditioning? Architects and builders — heating and ventilating experts — steamfitters and plumbers — must **meet this increasing demand** for ways of



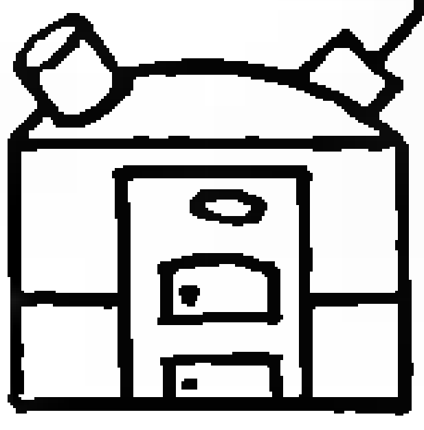
Controlling Winter and Summer

Made-to-order weather adds much to the comfort, health, and happiness of humanity. Air-conditioned working quarters materially **reduce lost time** due to illness and increase employe efficiency — air-conditioned homes insure **comfortable inside temperatures** regardless of the weather and cut down doctors' bills—air-conditioned apartments bring **increased rentals** that soon pay for the installation.

Air Conditioning offers you **a real chance** to get into a new and growing line where **good-paying jobs** are constantly opening up. Like the auto and radio, this new development is sweeping the country and revolutionizing industry.

What is the "Trade-In" Value of Your Present Job?

When changing conditions **threaten to wipe out your present job,** it's up to you to fit yourself for something else that will continue to provide **well-paid employment during your working life.** Usually **a little additional information** will adapt your experience to one of the new jobs — often offering **more money and brighter prospects.** Don't wait until your job is kicked out from under you — meet the changes as they come and **ride the wave of progress** to better times.



Our Air Conditioning Course will give you by home study, **in a short time,** thorough and up-to-date training in this profitable new line. **All texts furnished**—small monthly payments. Send TODAY for Free Bulletin. No obligation.

American School

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From: ....

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Speechless...When a Few Words Would Have Made Me!

But now I can face the largest audience without a trace of stage fright

THE annual banquet of our Association—the biggest men in the industry present—and without a word of warning the Chairman called on me to speak—and my mind went blank!

I half rose from my seat, bowed awkwardly and mumbled, "I'm afraid you'll have to excuse me today," and dropped back in my chair.

Speechless—when a few words would have made me! The opportunity I had been waiting for all my life—and I had thrown it away! If I could have made a simple little speech—giving my opinion of trade conditions in a concise, witty, interesting way, I know I would have been made for life!

Always I have been a victim of paralyzing stage fright. Because of my timidity, my diffidence, I was just a nobody, with no knack of impressing others—of putting myself across. No matter how hard I worked, it all went for nothing—I could never win the big positions, the important offices, simply because I was tongue tied in public.

And then like magic I discovered how to overcome my stage fright—and I was amazed to learn that I actually had a natural gift for public speaking. With the aid of a splendid new method, I rapidly developed this gift, until, in a ridiculously short time, I was able to face giant audiences—without a trace of stage fright!

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- **How to address board meetings**
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- **How to become a clear, accurate thinker**
- **How to develop your power of concentration**
- **How to be the master of any situation**

Today I am one of the biggest men in our industry. Scarcely a meeting or banquet is held without my being asked to speak. My real ability, which was hidden so long by stage fright, is now recognized by everyone. I am asked to conferences, luncheons and banquets as a popular after-dinner speaker. This amazing training has made me into a self-confident aggressive talker—an easy, versatile conversationalist—almost overnight.

* * *

No matter what work you are now doing or what may be your station in life; no matter how timid and self-conscious you now are when called upon to speak, you can quickly bring out your natural ability and become a powerful speaker. Now, through an amazing new home study training you can quickly shape yourself into an outstanding influential speaker, able to dominate one man or five thousand.

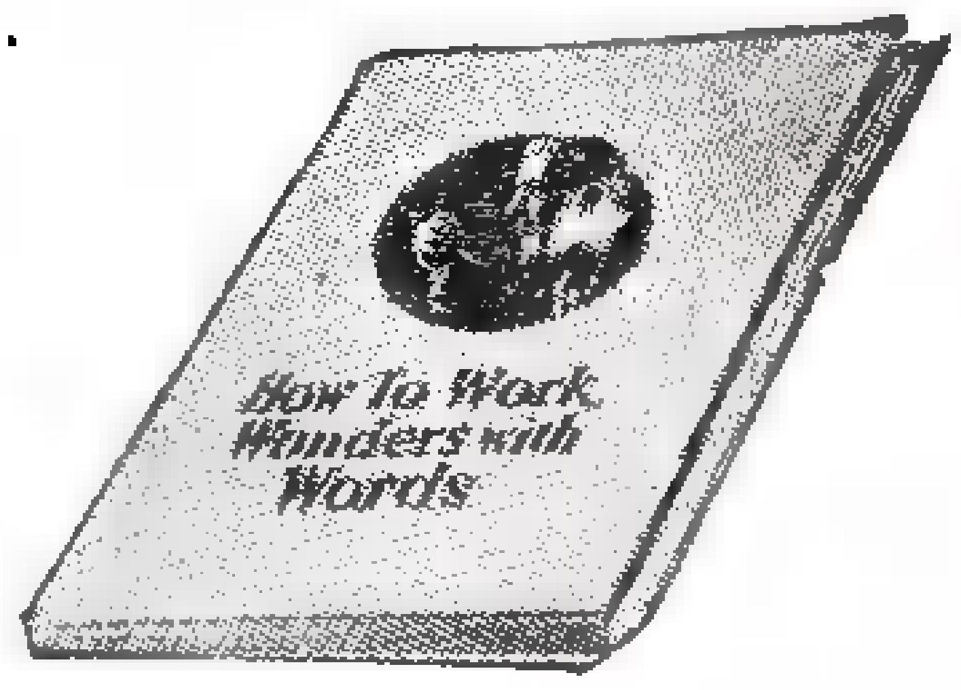
In 20 Minutes a Day

This new method is so delightfully simple and easy that you can not fail to progress rapidly. Right from the start you will find that it is becoming easier and easier to express yourself. Thousands have proved that by spending only 20 minutes a day in the privacy of their own homes they can acquire the ability to speak so easily and quickly that they are amazed at the great improvement in themselves.

Send for this Amazing Booklet

This new method of training is fully described in a very interesting and informative booklet which is now being sent to everyone mailing the coupon below. This booklet is called *How to Work Wonders with Words.* In it you are told how this new, easy method will enable you to conquer stage fright, self-consciousness, timidity, bashfulness and fear. Not only men who have made millions but thousands of others have sent for this booklet and are unstinting in their praise of it. You are told how you can bring out and develop your priceless "hidden knack"—the natural gift within you—which will win you advancement in position and salary, popularity, social standing, power and real success. You can obtain your copy absolutely free by sending the coupon.

Now Sent FREE



NORTH AMERICAN INSTITUTE
3601 Michigan Ave.
Dept. 2059 Chicago, Illinois

North American Institute,
3601 Michigan Avenue,
Dept. 2059, Chicago, Ill.

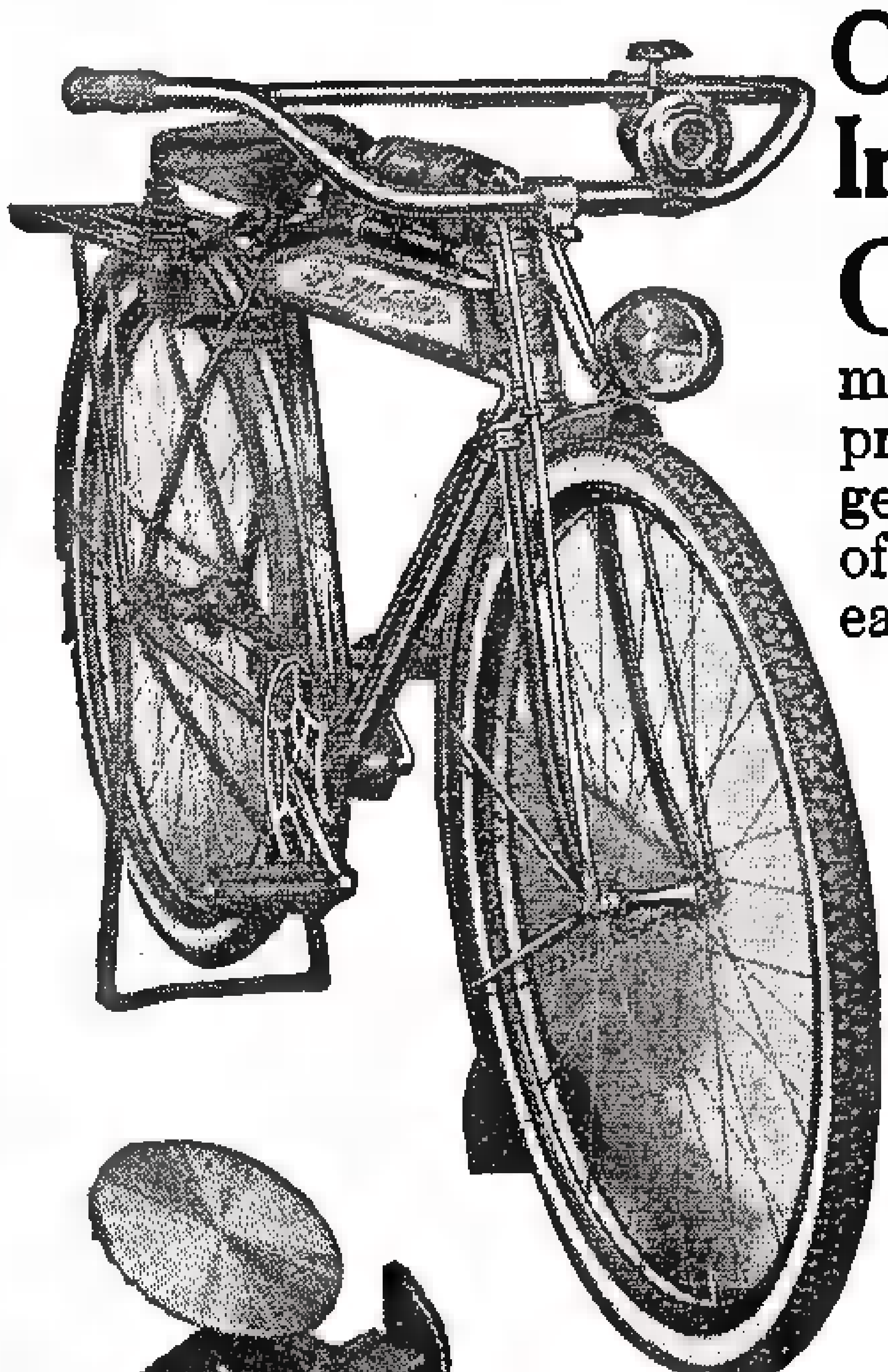
Please send me FREE and without obligation my copy of your inspiring booklet, *How to Work Wonders with Words,* and full information regarding your course in Effective Speaking.

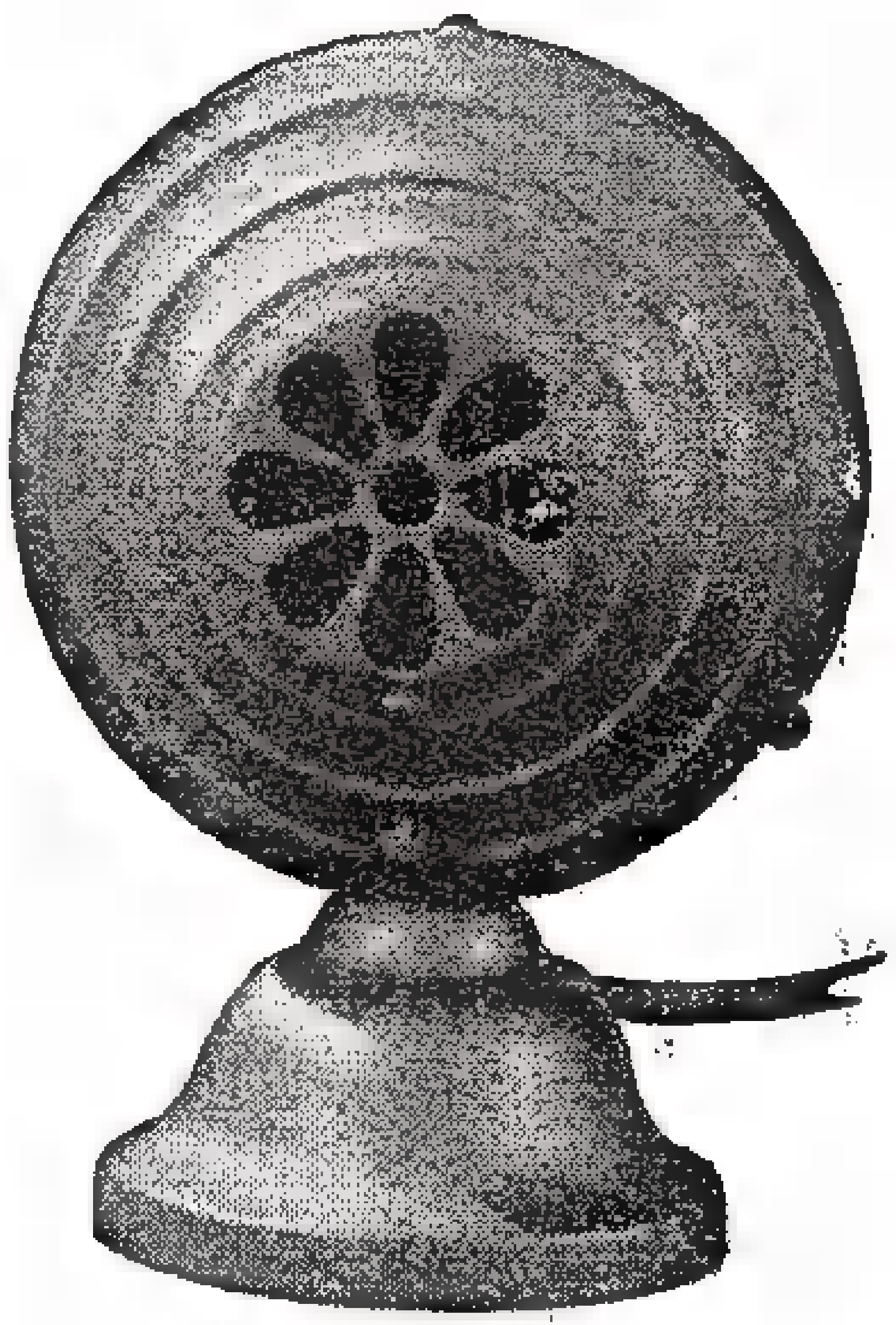
Name ....

Address ....

City ....State..........

GIVEN WITHOUT COST

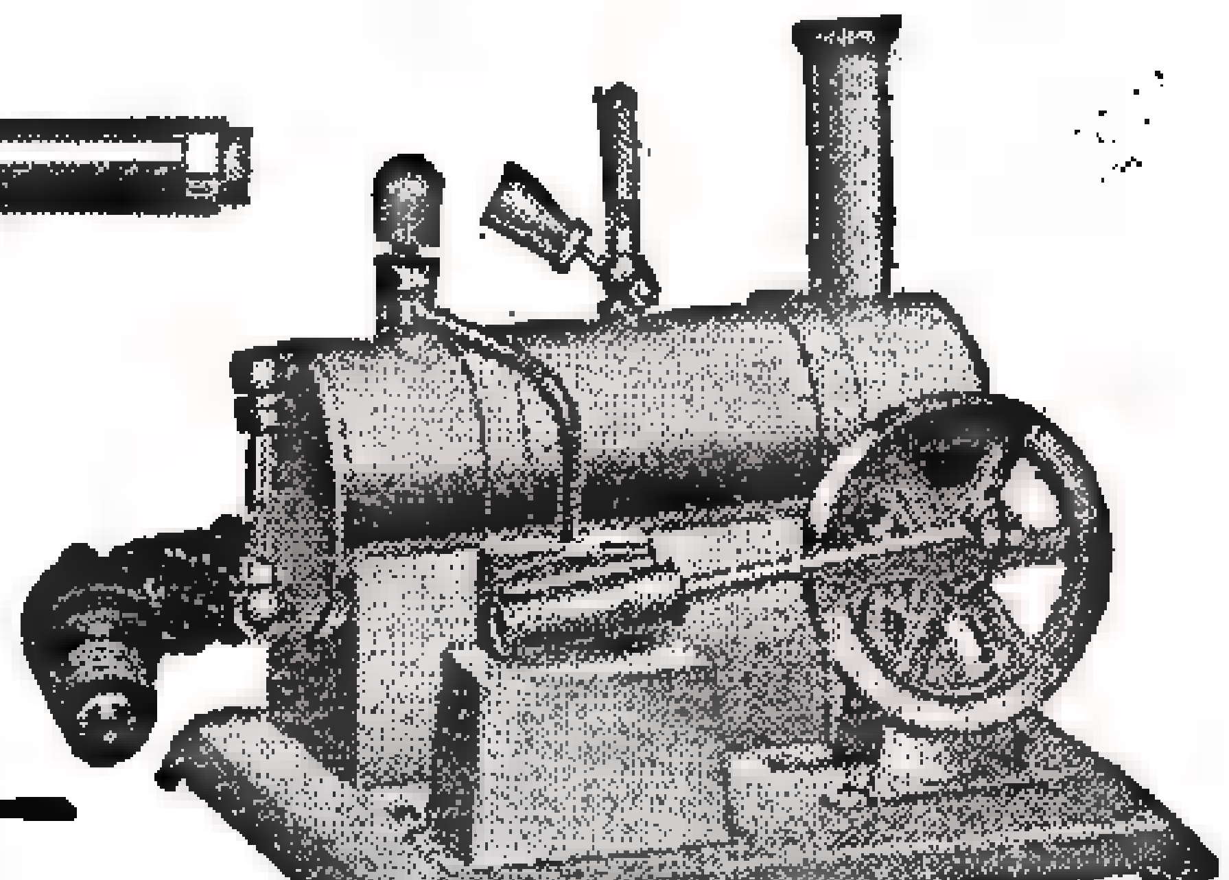




Over 300 Dandy Big Prizes Including a Speedy Motorbike!

OH, BOY! Here's your opportunity to win over 300 big prizes *without cost!* Get this 1934 deluxe model motorbike, fully equipped. Win a printing press, open a shop of your own, and make money. Or get this radio microphone and go on the air! Heaps of fun. . . . Besides these wonderful prizes, you can earn CASH PROFITS. It's easy! Just deliver 3 fine magazines to customers in your neighborhood. No experience necessary. Mail the coupon NOW—and we'll start you!

You'll have lots of fun studying the moon, stars, birds, and wild life with this telescope. Ten power. Mail the coupon right away, and start winning it.



Mail the COUPON

Jim Thayer, Dept. 442
The Crowell Publishing Co., Springfield, Ohio

Dear Jim: I want to earn MONEY and PRIZES. Start me at once, and send me a big Prize Book, showing over 300 prizes that I can win.

Name...Address...

City...State...Age...........

"A Funny Way" to Make Muscles Grow!

Most fellows think it takes a lot of strenuous exercise to develop BIG MUSCLES. But here's a wonderful new way to make them GROW in double-quick time.

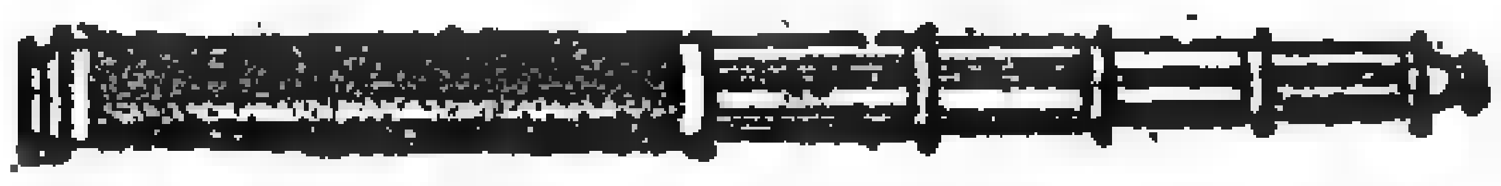
MIRACLE EXPANSION
The New Short-Cut to Health, Strength, Muscles

No wonder men are amazed when they see how my new method makes muscles grow—in less time and with less effort than they ever thought possible. Let me show YOU how I can cover your body with bulging bands of strength—broaden your shoulders, deepen your chest, give you a mighty pair of biceps. I'll strengthen your internal organs, too, fill you chock full of health and energy. You'll be astonished the way your whole body responds to this new, wonder method.

TRY this New Way

Here's my sensational offer to you: Send me your name, address and FIFTY CENTS and I'll start you on "MIRACLE EXPANSION" by return mail. Follow my easy, fascinating instructions for a week. They require just a few minutes a day. If you're not delighted with results, back comes your money. I'll give you a NEW BODY or no cost. Send 50c TODAY. Address

W. HARRY TITUS
39 Union Square West W-12 New York, N. Y.



Big 3½ft. Telescope

5 sections, brass bound. 10-mile range. Study Moon, Stars and distant objects with this powerful 8-x instrument. Special eye piece for viewing Sun included FREE. Makes an ideal Microscope. Guaranteed. Big value. Postpaid $1.75. C. O. D. 15c extra.

BENNER & COMPANY, T-75, TRENTON, N. J.

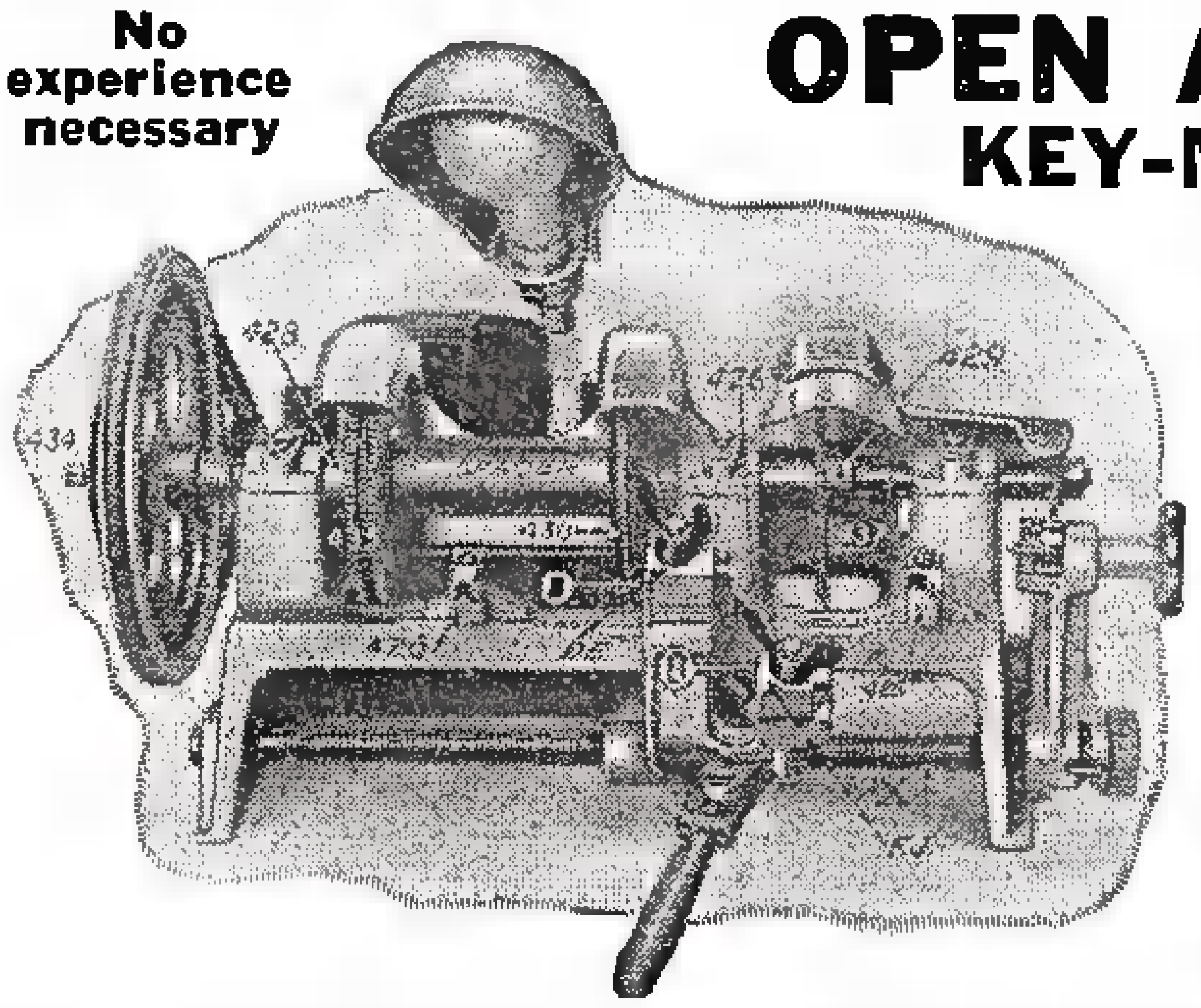
NOW $2000.00 LIFE & ACCIDENT PROTECTION AT ACTUAL COST

Amazing New LIFE PLAN costs ONLY 3c A DAY per $1,000.00. Pays up to $2,000.00 for NATURAL or ACCIDENTAL DEATH. Issued with a big **Reliable State Chartered Company.** Benefit does NOT decrease as you grow older. Age limits, 11 to 80. **No Medical Examination.** Certificate sent on FREE APPROVAL, without cost or obligation. Just send your name, address, age and Beneficiary's name. PAY NOTHING. Write now.

INTERSTATE AID ASSN., Desk M-3, 75 [illegible] Wacker Drive, CHICAGO, ILL.

No experience necessary

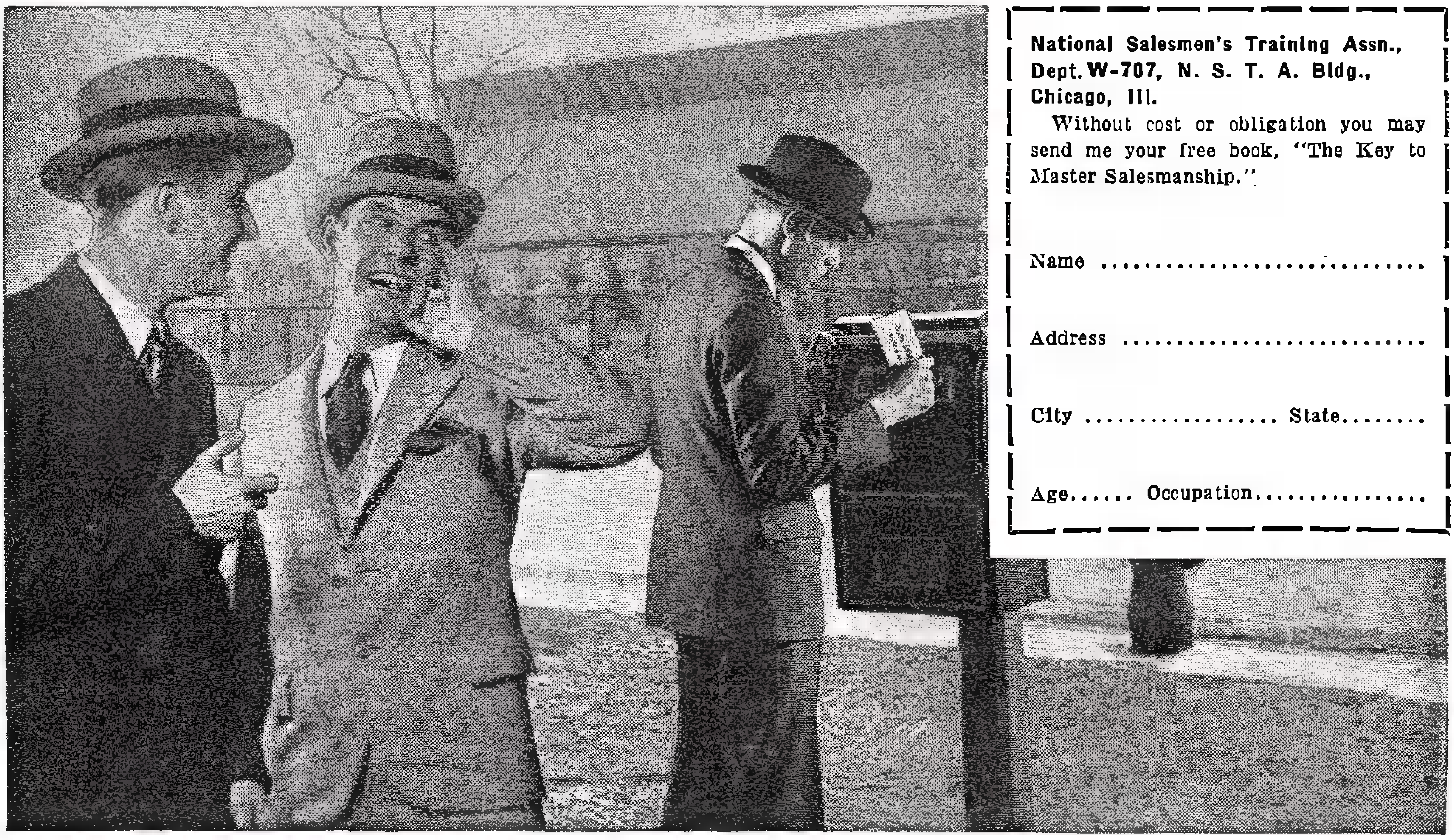
OPEN A KEY-MAKING SHOP!



Start a business of your own. Instructions furnished. The only key machine that cuts ALL types of keys. No hand-filing. Make first keys by number of lock without taking lock apart.

Write for FREE Circular.

Beisser Manufacturing Co. 409 E. Fort St. Detroit, Mich., U. S. A.



National Salesmen's Training Assn.,
Dept. W-707, N. S. T. A. Bldg.,
Chicago, Ill.

Without cost or obligation you may send me your free book, "The Key to Master Salesmanship."

Name ....

Address ....

City .... State........

Age...... Occupation...............

They Laughed When I Mailed This Coupon

..But It Brought Me The Book That Showed Me How to Make Over $5,000 a Year!

As I walked up to the mail box, Joe nudged Ed and winked broadly for my benefit.

"Sh!" he hissed in a loud stage-whisper. "This is going to be the big turning point in Frank Parker's life! He's writing for a book that tells how to get into salesmanship. Pretty soon he'll be earning so much that he'll make the rest of us look like pikers!"

Ed snickered.

"Won't it be grand!" he grinned. "Now he can quit punching time-clocks and eating 25-cent lunches." He raised his voice. "Drop me a postal sometime when you get out into big business and start making $5,000 or $6,000 a year, will you, Frank?"

They both laughed uproariously. And probably it **did** seem like a joke to them that a $25 a week clerk would have the nerve to think he could ever get anywhere or make real money without some special "gift" or "pull."

But they laughed too soon. Just yesterday I sat down and wrote to Ed who is still at the shop, dragging along at the same old job. "Dear Ed"—I wrote. "You asked me to send you a card when I 'got into big business and started making real money.' Well, here's your card. Yesterday I was promoted to the job of assistant Sales Manager of the Western Metal Works, at a salary that goes with it. I'll loan you my copy of that book on salesmanship you used to think was such a joke."

Only a book! Just seven ounces of paper and printers' ink—but it contains one of the most vivid and inspiring messages that any ambitious man can read. It reveals the real truth about the art of selling, explains the science of selling in simple terms, and tells exactly how the great sales records of nationally-known star salesmen are achieved. And not only that—it outlines a simple plan that will enable almost any man to master scientific salesmanship without spending a moment on the road—without losing a day or a dollar from his present position.

A Few Weeks—Then Bigger Pay

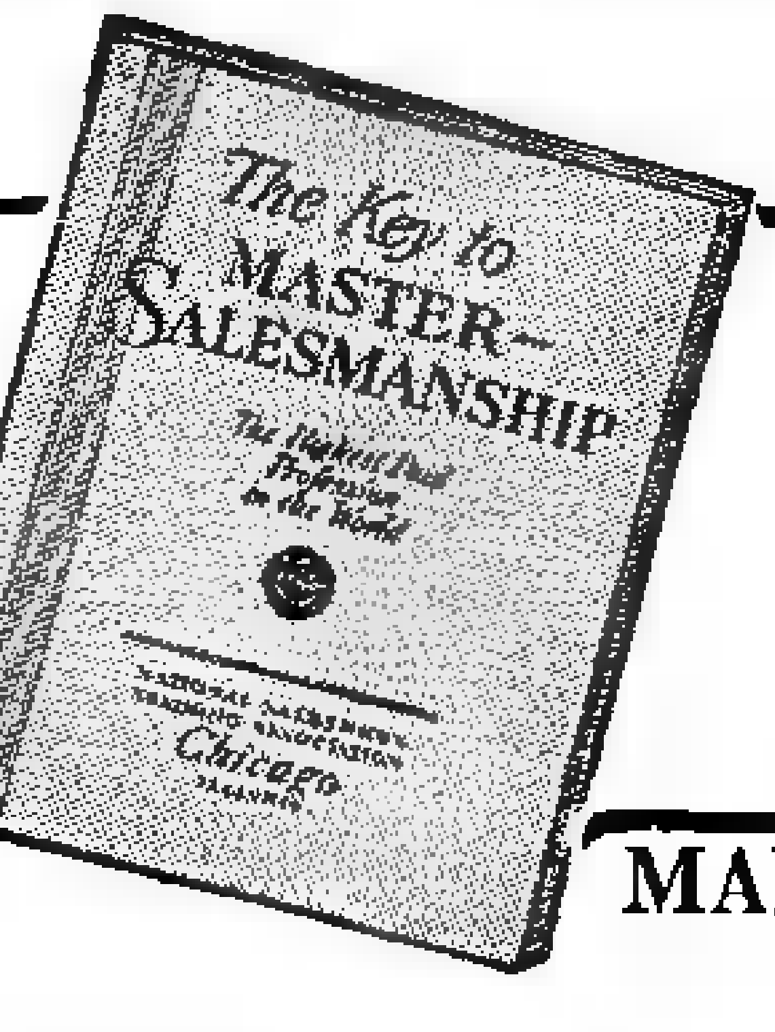
Reason it out for yourself. Salesmanship offers bigger returns and delivers them quicker than any other line of work under the sun. But many people have subscribed to the foolish notion that a man has to be "born" with some sort of "gift" for salesmanship. Nothing could be farther from the truth. Just like any other profession, salesmanship is governed by certain fundamental rules and laws—laws which you can master as easily as you learned the alphabet.

Right now an unusual demand for salesmen is being reported. City and traveling sales positions are open in nearly every line all over the country. Every month more calls for trained men are received. This employment service is free to both employers and employees, and thousands have secured excellent positions this way.

Free to Every Man

See for yourself why "The Key to Master Salesmanship" has been the deciding factor in the careers of so many men who are now making $4,000 to $10,000 a year. See how J. W. Haulman, of Baltimore, Md., used his N.S.T.A. Training to more than double his income—in spite of "hard times." Find out how H. A. Lamy, of Montreal, Canada, first doubled and later tripled his income. Learn for yourself the REAL truth about the art of selling! If we were asking $2 or $3 a copy you might hesitate. But the book is now FREE. You do not risk one penny nor incur the slightest obligation. And since it may alter your entire future, it certainly is worth your time to fill out and clip the coupon at the top of this page. Why not do it now!

National Salesmen's Training Association
"Salesmanship Headquarters Since 1907"
Dept. W-707
N.S.T.A. Bldg. Chicago, Ill.


The Key to Master-Salesmanship
National Salesmen's Training Association
Chicago

Where Shall We Send Your Copy—FREE!

MAIL COUPON ABOVE TODAY

Remember

SAME LOW PRICE!
$2.95
Per gallon

EVEREADY PRESTONE
THE PERFECT ANTI-FREEZE
Does Not Boil Off

Play safe this year with
EVEREADY PRESTONE
THE GUARANTEED ANTI-FREEZE

ONE SHOT of Eveready Prestone... *put in now*... will keep your car safe. For every drop of Eveready Prestone is protection from both freeze-up and rust. At $2.95 a gallon Eveready Prestone is ALL ANTI-FREEZE... no water... no dilution of any kind.

Make the Nose Test: Eveready Prestone, truly non-evaporating, is odorless. But "boil-away" anti-freezes can always be identified by a noticeable odor. Regardless of special "treatments," claimed to decrease evaporation, they will evaporate rapidly when the engine runs at high speeds.

A SPECIFIC GUARANTEE

National Carbon Company, Inc., specifically guarantees that Eveready Prestone, used according to directions, will protect the cooling system of your car against freezing and clogging from rust formations for a whole Winter; also that it will not boil away, will not cause any damage to car finish, or to the metal or rubber parts of the cooling system, and that it will not leak out of a cooling system tight enough to hold water. National Carbon Company, Inc., General Offices, New York, N. Y. Unit of Union Carbide UCC and Carbon Corporation.

IT'S ALL ANTI-FREEZE...NO WATER

BOILING HOT *on a cake of ice!*

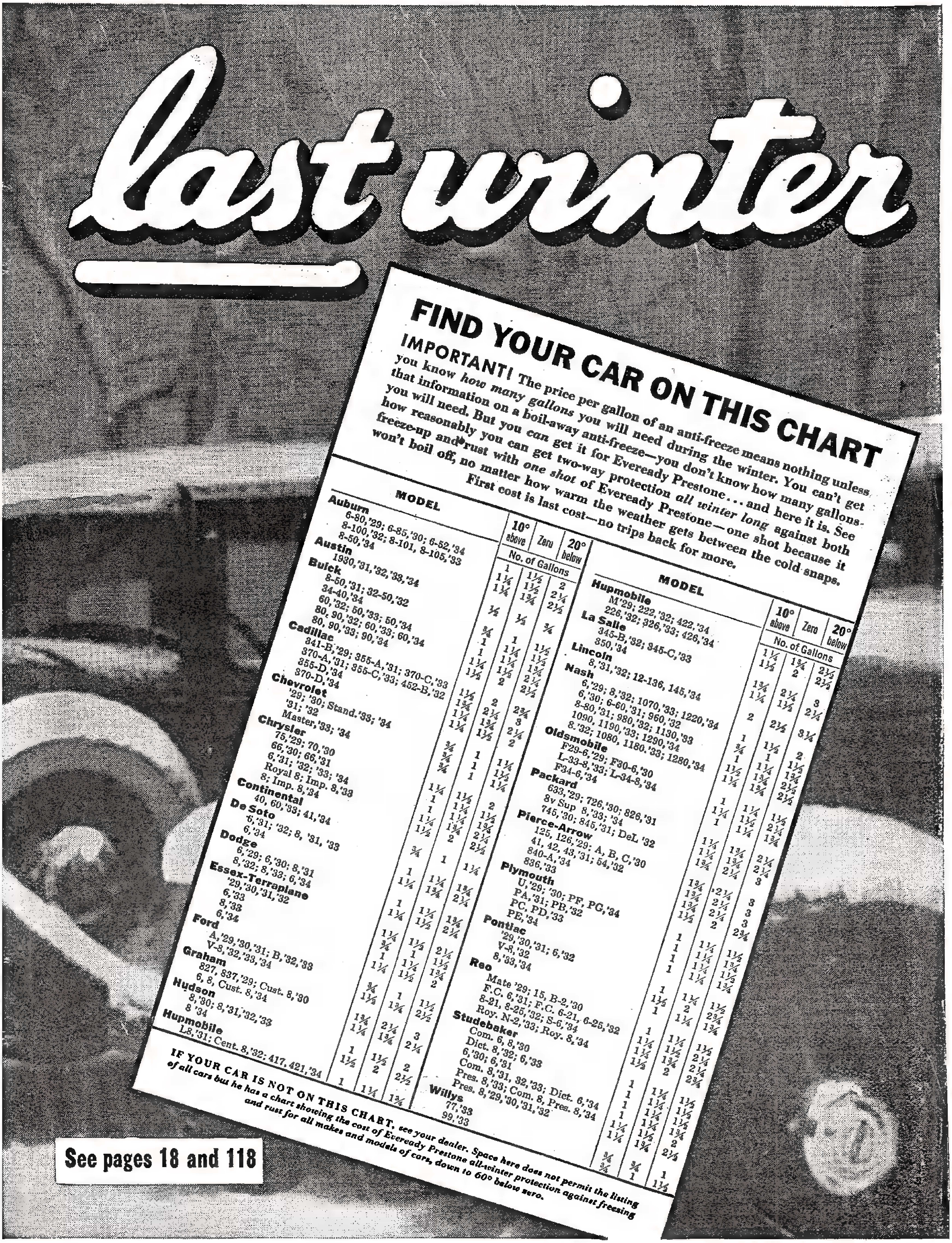
IT SEEMS like black magic to some, but—a pan of clear liquid will boil merrily if placed on a cake of ice. Of course, the liquid must have an extremely low boiling point, like liquid air, boiling at minus 318° Fahrenheit.

Apparent paradoxes of heat and cold are common. In Winter, if a motorist uses an anti-freeze with a boiling point lower than water, sooner or later it boils off. *Any* anti-freeze with that "boil-away" odor will boil off, regardless of special "treatments." Then, his car "freezes" . . . that is to say: Tiny particles of ice in the radiator-core clog the circulation and cause over-heating around the engine-head. Thus in *coldest* weather his car *boils* . . . boils away the anti-freeze, and badly damages the car with *heat.* Magic? No—carelessness!

A sure guarantee against such a dilemma is Eveready Prestone—the all-Winter concentrated anti-freeze. Don't confuse Eveready Prestone with either glycerine or alcohol. By actual tests it protects against rust from 5 to 20 times longer than other anti-freezes. It is undiluted, guaranteed one-shot protection, down to 60° below zero, if desired. Prevents "freeze-up," rust, and corrosion. It will not boil off, and is absolutely odorless.

Full protection so inexpensive!

Read the full guarantee above, and protection chart on the opposite page. Here you will see how inexpensively *your car* can have Eveready Prestone protection all Winter long.



last winter

FIND YOUR CAR ON THIS CHART

IMPORTANT! The price per gallon of an anti-freeze means nothing unless you know *how many gallons* you will need during the winter. You can't get that information on a boil-away anti-freeze—you don't know how many gallons you will need. But you *can* get it for Eveready Prestone... and here it is. See how reasonably you can get two-way protection *all winter long* against both freeze-up and rust with *one shot* of Eveready Prestone—one shot because it won't boil off, no matter how warm the weather gets between the cold snaps. First cost is last cost—no trips back for more.

MODEL	10° above	Zero	20° below
	No. of Gallons		
Auburn			
6-80,'29; 6-85,'30; 6-52,'34	1	1½	2
8-100,'32; 8-101, 8-105,'33	1¼	1½	2¼
8-50,'34	1¼	1¾	2½
Austin			
1930,'31,'32,'33,'34	½	½	¾
Buick			
8-50,'31; 32-50,'32	¾	1	1½
34-40,'34	1	1¼	1½
60,'32; 50,'33; 50,'34	1	1¼	1¾
80, 90,'32; 60,'33; 60,'34	1¼	1½	2¼
80, 90,'33; 90,'34	1½	2	2½
Cadillac			
341-B,'29; 355-A,'31; 370-C,'33	1½	2	2¾
370-A,'31; 355-C,'33; 452-B,'32	1¾	2¼	3
355-D,'34	1¼	1¾	2¼
370-D,'34	1¼	1½	2
Chevrolet			
'29; '30; Stand.'33; '34	¾	1	1¼
'31; '32	¾	1	1½
Master,'33; '34	¾	1	1¼
Chrysler			
75,'29; 70,'30	1¼	1½	2
66,'30; 66,'31	1	1¼	1½
6,'31; '32; '33; '34	1	1¼	1¾
Royal 8; Imp. 8,'33	1¼	1¾	2¼
8; Imp. 8,'34	1½	2	2½
Continental			
40, 60,'33; 41,'34	¾	1	1¼
De Soto			
6,'31; '32; 8, '31, '33	1	1¼	1¾
6,'34	1¼	1¾	2¼
Dodge			
6,'29; 6,'30; 8,'31	1	1¼	1¾
8,'32; 8,'33; 6,'34	1¼	1½	2¼
Essex-Terraplane			
'29,'30,'31,'32	1¼	1½	2¼
6,'33	¾	1	1½
8,'33	1	1¼	1¾
6,'34	1¼	1½	2
Ford			
A,'29,'30,'31; B,'32,'33	¾	1	1½
V-8,'32,'33,'34	1½	1¾	2½
Graham			
827, 837,'29; Cust. 8,'30	1¾	2¼	3
6, 8, Cust. 8,'34	1¼	1¾	2¼
Hudson			
8,'30; 8,'31,'32,'33	1	1½	2
8 '34	1½	2	2½
Hupmobile			
L8,'31; Cent. 8,'32; 417, 421,'34	1	1¼	1¾
M'29; 222,'32; 422,'34	1¼	1¾	2½
226,'32; 326,'33; 426,'34	1½	2	2½
La Salle			
345-B,'32; 345-C,'33	1¾	2¼	3
850,'34	1¼	1½	2¼
Lincoln			
8,'31,'32; 12-136, 145,'34	2	2½	3¼
Nash			
6,'29; 8,'32; 1070,'33; 1220,'34	1	1½	2
6,'30; 6-60,'31; 960,'32	¾	1	1½
8-80,'31; 980,'32; 1130,'33	1	1¼	1¾
1090, 1190,'33; 1290,'34	1½	1¾	2½
8.'32; 1080, 1180.'33; 1280,'34	1¼	1¾	2½
Oldsmobile			
F29-6,'29; F30-6,'30	1	1¼	1½
L-33-8,'33; L-34-8,'34	1¼	1½	2¼
F34-6,'34	1	1¼	1¾
Packard			
633,'29; 726,'30; 826,'31	1¼	1¾	2¼
8v Sup 8,'33; '34	1¼	1¾	2¼
745,'30; 845,'31; DeL '32	1¾	2¼	3
Pierce-Arrow			
125, 126,'29; A, B, C,'30	1¾	2¼	3
41, 42, 43,'31; 54,'32	1¾	2¼	3
840-A,'34	1¾	2¼	3
836,'33	1½	2	2¾
Plymouth			
U,'29; '30; PF, PG,'34	1	1¼	1½
PA,'31; PB,'32	1	1¼	1¾
PC, PD,'33	1	1¼	1½
PE,'34	1	1¼	1¾
Pontiac			
'29,'30,'31; 6,'32	1	1¼	1½
V-8,'32	1½	2	2¾
8,'33,'34	1	1¼	1¾
Reo			
Mate '29; 15, B-2,'30	1	1¼	1½
F.C. 6,'31; F.C. 6-21, 6-25,'32	1¼	1½	2¼
8-21, 8-25,'32; S-6,'34	1¼	1¾	2¼
Roy. N-2,'33; Roy. 8,'34	1½	2	2¾
Studebaker			
Com. 6, 8,'30	1	1¼	1½
Dict. 8,'32; 6,'33	1	1¼	1½
6,'30; 6,'31	1	1¼	1½
Com. 8,'31, 32,'33; Dict. 6,'34	1	1¼	1¾
Pres. 8,'33; Com. 8, Pres. 8,'34	1¼	1½	2
Pres. 8,'29,'30,'31,'32	1¼	1¾	2½
Willys			
77,'33	¾	¾	1
99,'33	¾	1	1½

IF YOUR CAR IS NOT ON THIS CHART, *see your dealer. Space here does not permit the listing of all cars but he has a chart showing the cost of Eveready Prestone all-winter protection against freezing and rust for all makes and models of cars, down to 60° below zero.*

See pages 18 and 118

WHAT INSTRUMENT DO YOU WANT TO LEARN TO PLAY?

QUICK WAY TO LEARN MUSIC

Thousands now play in ½ the time and at but a fraction of the old way costs

Simplified, quick method brings amazing results...VOUCHED FOR BY OVER 700,000 PUPILS

Have you ever dreamed of the fun you'd have playing some musical instrument? Pictured yourself doing all the popular hits, movie theme songs, even classical numbers? Then here's grand news for you! It's news of an easy, fascinating, simplified method whereby *anyone* can learn to play real music *by notes* in a *remarkably short time!* And what's more, you won't need a private teacher. You'll learn all by yourself—right in your own home. And best of all, the cost is only a small fraction of what it used to cost by old-fashioned methods.

No Special "Talent" Needed

If you can just hum or whistle a tune, you can learn to play quickly—easily—with the aid of this wonderful U. S. School of Music system of instruction. You learn to read regular notes—and to play them—just as any real musician does.

You start right in playing real little tunes almost from the very start. Gradually you master more and more difficult ones until—sooner than you ever expected—you find yourself entertaining your friends—playing at parties—and having the best times you ever had in your whole life.

PICK YOUR INSTRUMENT

Piano
Violin
Organ
Clarinet
Ukulele
Flute
Coronet
Saxophone
Trombone
Harp
Piccolo
Mandolin
Guitar
'Cello
Hawaiian Steel Guitar
Trumpet
Sight Singing
Piano Accordion
Italian and German Accordion
Voice and Speech Culture
Harmony and Composition
Drums and Traps
Automatic Finger Control
Banjo (Plectrum, 5-String or Tenor)
Juniors' Piano Course

Easy as A—B—C

The success of this U. S. School method of musical instruction is due to two things. One is the fact that it makes everything so simple—so crystal clear—so easy to understand. First it *tells* you how to do a thing. Then it *shows* you in pictures how to do it. Then you do it yourself and *hear* it. What could be simpler?

The second reason for the success of this system is that it is so fascinating. Learning music this way is like playing a game. Practicing becomes real fun instead of a bore as it used to be with the old way.

Free Booklet and Demonstration Lesson

In order to show how easy—how simple—how pleasant this course is, the U. S. School of Music has prepared for you a free Demonstration Lesson and Explanatory Booklet. No matter what instrument you select to play the Free Demonstration Lesson and Booklet will show you at once the amazingly simple principles around which this method is built. And how it will enable you to become a popular musician in a surprisingly short time—at a cost of only a few cents a day.

If you really want to learn music—if you want to win new popularity—if you want to enjoy musical good times galore—fill in and mail the coupon below. Don't delay—act at once. You'll not be obligated in any way. U. S. School of Music, 26212 Brunswick Bldg., New York City.

START NOW TO MUSICAL GOOD TIMES

U.S. SCHOOL OF MUSIC
26212 Brunswick Building, New York City, N.Y.

Please send me your free book "How You Can Master Music in Your Own Home," with inspiring message by Dr. Frank Crane, Free Demonstration Lesson and particulars of your easy payment plan. I am interested in the following course:

________________ Have you Instrument? ________

Name ________________

Address ________________

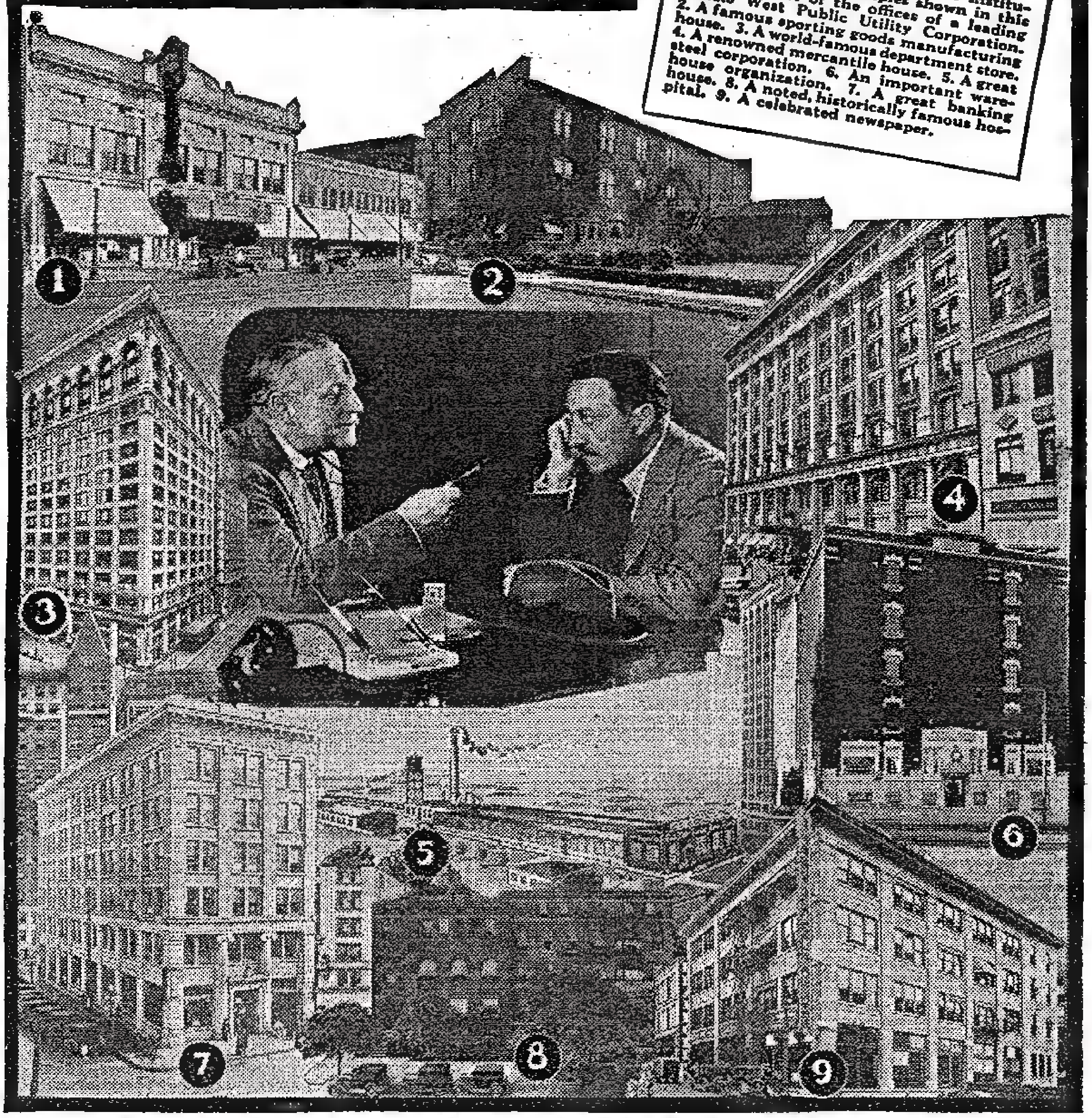
City ________________ *State* ________

LONG NEEDED INVENTION SWEEPS COUNTRY

A BUSINESS IN THE PIONEER STAGE, AS NEW AS AIR CONDITIONING, PAYING PROFITS COMPARABLE TO PROFITS MADE IN EARLY DAYS OF RADIO AND AUTOMOBILES

INSTALLATIONS FROM $7.50 TO $150.00 AND UP ON WHICH SALESMAN MAKES $5.00 TO $116.70 AND UP.

This is a call for men everywhere to handle exclusive agency for one of the most unique business inventions of the past decade. To such men we say, "This is no doubt one of the most revolutionary money making inventions that has ever come to your attention." To those who ask, "Is it some clever new gadget?" we say, emphatically, "NO! This is no knick-knack, no trick filing idea—no new kind of adding machine—not a check protector." Instead, it is an invention needed by the smallest business man as well as the largest corporation and it has already saved countless thousands for the business firms which have adopted it. AND, in so doing, IT HAS PAID THOUSANDS TO THE SALESMEN WHO HAD THE GOOD LUCK TO BE THE FIRST TO SEE OUR NEWSPAPER HELP WANTED ADVERTISEMENTS! Think of it! One of these first men has already made over 1,000 sales—each of these sales paying a profit of $5 to $60—truly a fortune in profits on the 1,000 sales! Another's record shows $1,080 profit in 23 days! Still another's orders give him a profit of $4,920 in three months! Now we know this is a great success—and now we are out to cover the entire country. Men wanted everywhere. Any man, young or mature, who grasps this opportunity, may duplicate this success. The annual business should run into millions. We feel it will be worth while for every man who realizes the importance of this opportunity to telegraph, or rush by fastest mail, the coupon for our proposition.



RECORD SALES

made to leading firms, foremost institutions in America. Examples shown in this photo: 1. One of the offices of a leading Middle West Public Utility Corporation. 2. A famous sporting goods manufacturing house. 3. A world-famous department store. 4. A renowned mercantile house. 5. A great steel corporation. 6. An important warehouse organization. 7. A great banking house. 8. A noted, historically famous hospital. 9. A celebrated newspaper.

Saves Thousands of Dollars for Offices, Stores, Factories

What is this remarkable invention? You have to see what it is, read all about it, what it has accomplished, to believe it is possible. This astounding record of accomplishment is reported and verified over the signatures of many of America's finest and most distinguished business houses. Large firms are not the only beneficiaries—small organizations are enjoying tremendous dividends, too. Sanders Ridgeway of Kansas invests $88.60, saves $4,707.00 between April 5th and June 29th. Fox Ice and Coal Co., Wisconsin, saves $3,564.00. Baltimore Sporting Goods Co. saves $1,600.00 on $45 installation. L. S. Warner Merc. Co., Texas, saves over $1,000 on $15 installation. Safety Auto Lock Co., New York, gets $15 installation, saves $686.45. With these and scores of similar results to display, our representatives interest every business man, from the very smallest to the very largest. No one can dispute the proof in the photo-copies of actual letters which our men show.

Installed on Free Trial—Sells Itself—Saves Enough to Pay for Itself Before Salesman Returns

We actually enable you to make installations at our risk, let the customer sell himself after the installation is in and working. This does away with the need for high pressure selling—it eliminates the handicap of trying to get money before customer is really convinced. You simply tell what you offer, show proof of success in every line of business and every section of the country. Then install our invention without a dollar down. It starts working at once. In a few short days, the installation has actually produced cash money that is there and available to pay for the deal, with profits above the investment coming in at the same time! You then call back, collect your money. Think of it! Out of every $75 business you do, nearly $60 is your own profit! The very smallest you make is $5.00 on a $7.50 installation! Nothing is so convincing as our offer to let results speak for themselves without risk to the customer!

Each Installation Paves Way for Automatic Repeat Sales

No need to go elsewhere, once you have sold every good prospect in town. You may stay where you are and build up a permanent substantial business. Every pleased customer needs "refill" supplies constantly. You make exactly the same commission on these big repeat orders as you do on the original sale. Washington Sanitarium and Hospital writes, "We have already used more than ten installations of the large size so far." H. C. Heath writes, "We have only 13,000 population and I have already sold 76 installations, many of which repeated, and the above order makes 128 units for yours truly." Practically every time you establish a new customer, you increase your *permanent income* from *repeat business*. This enables you, on exclusive contract, to build an established, permanent route of customers which can be sold anytime like any other established business.

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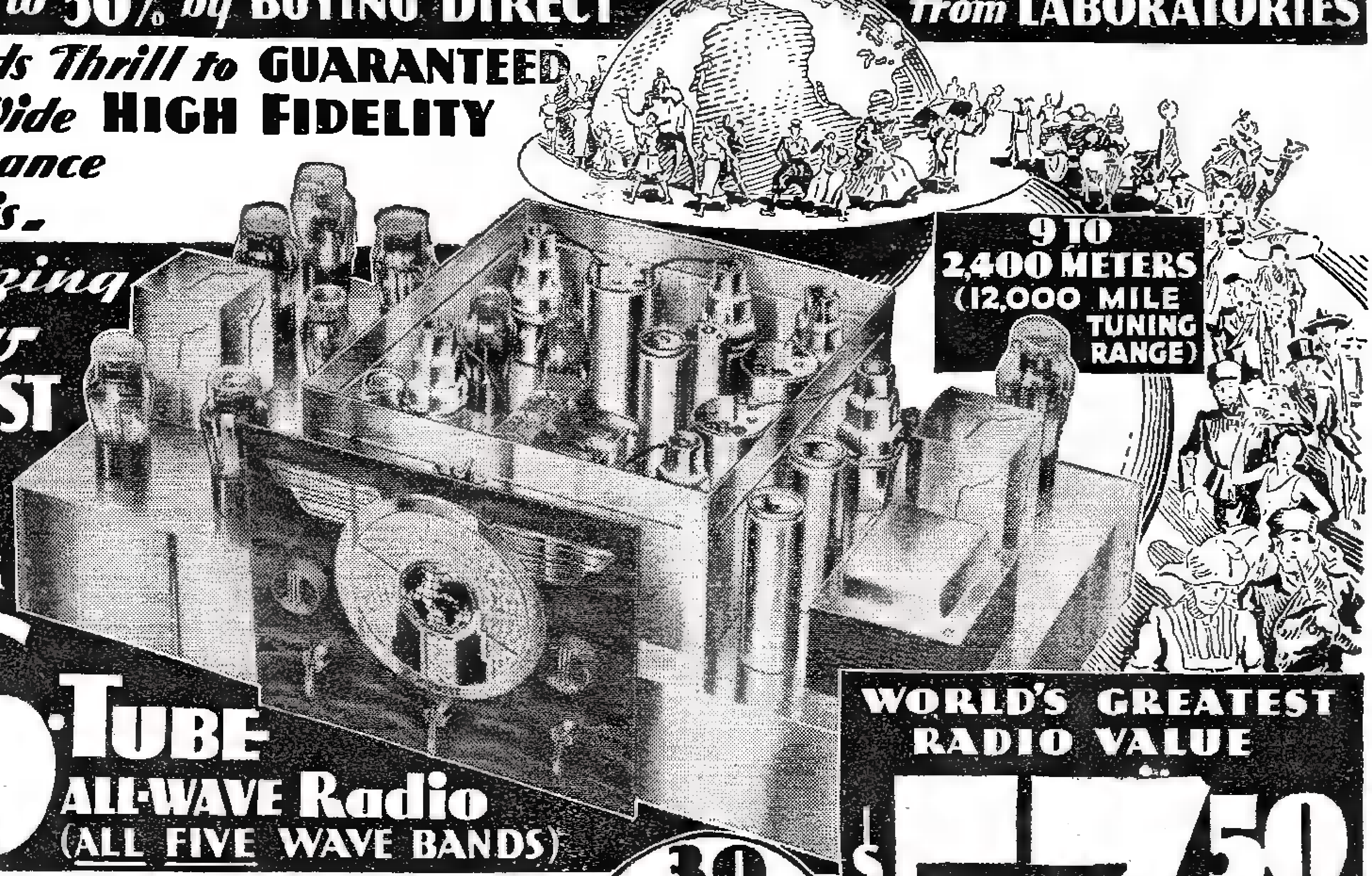

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50 ADVANCED 1935 FEATURES.....

...and 16 tubes make this Super High Fidelity Radio today's most powerful long distance receiver. Its many exclusive features include: Micro-Tenuator . . . Fidel-A-Stat . . . Separate Audio Generator . . . Ceramic Coil Forms, etc.

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This dial takes the guesswork out of tuning. Now Midwest guarantees that inexperienced persons can secure good foreign reception. Send for FREE miniature of actual rotating dial—which clearly shows the advantages of these sensational features:

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THRILL
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SEND NO MONEY!

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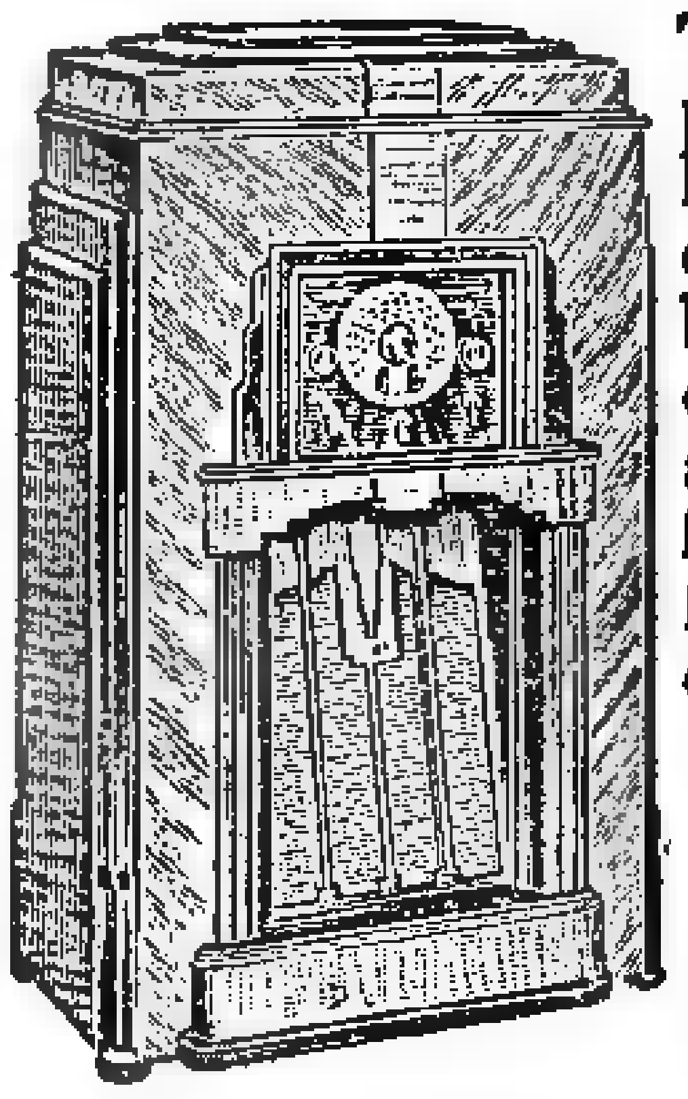

The Midwest 36-page 1935 catalog pictures a complete line of beautiful, artistic deluxe consoles and chassis, in four colors. Write for new FREE catalog today!

Midwest long range radios are priced as low as..... $27.50

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Increasing costs are sure to result in higher radio prices soon. Buy before the big advance...NOW... while you can take advantage of Midwest's sensational values...no middlemen's profits to pay. You can order your High Fidelity radio from the new Midwest catalog with as much certainty of satisfaction as if you were to select it in our great radio laboratories. You save 30% to 50% when you buy this popular way... you get 30 days FREE trial...**as little as $5.00 down** puts a Midwest radio in your home. Satisfaction guaranteed or money back. Write for new FREE catalog.

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MIDWEST RADIO CORP.
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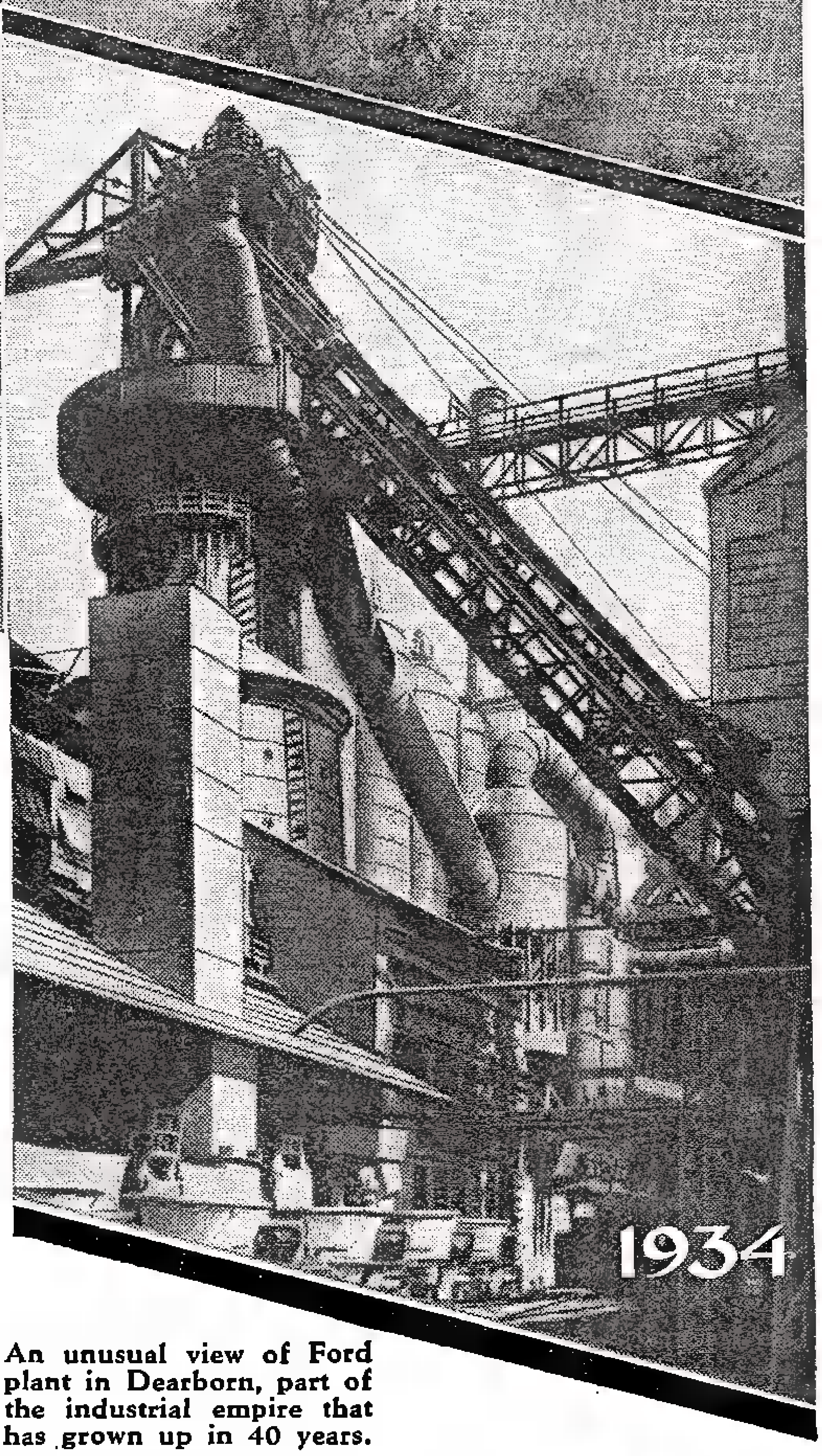
Established 1920 Cable Address Miraco. . . . . All Codes

HENRY FORD

Henry Ford (left) and his son, Edsel, are shown above on top of the administration building overlooking the River Rouge plant, the heart of Ford's automobile industry.



An unusual view of Ford plant in Dearborn, part of the industrial empire that has grown up in 40 years.

HENRY FORD, the industrial genius of modern times, sees industry entering a vast, wide-open era of experiment, invention and discovery. He believes that in the next twenty-five years man will achieve results overshadowing the dreams of today.

This new trend has already begun under the stimulation of Henry Ford's inventive mind. He is convinced that the farm will be the scene of great industrial development and that chemistry will be the agency by which these changes will be evolved.

A start has been made in this direction. Science is discovering means of transforming products of the farm into materials for manufacture. Through his experimental farms, Henry Ford now successfully con-
v automobile
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astic indus-
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breaking.

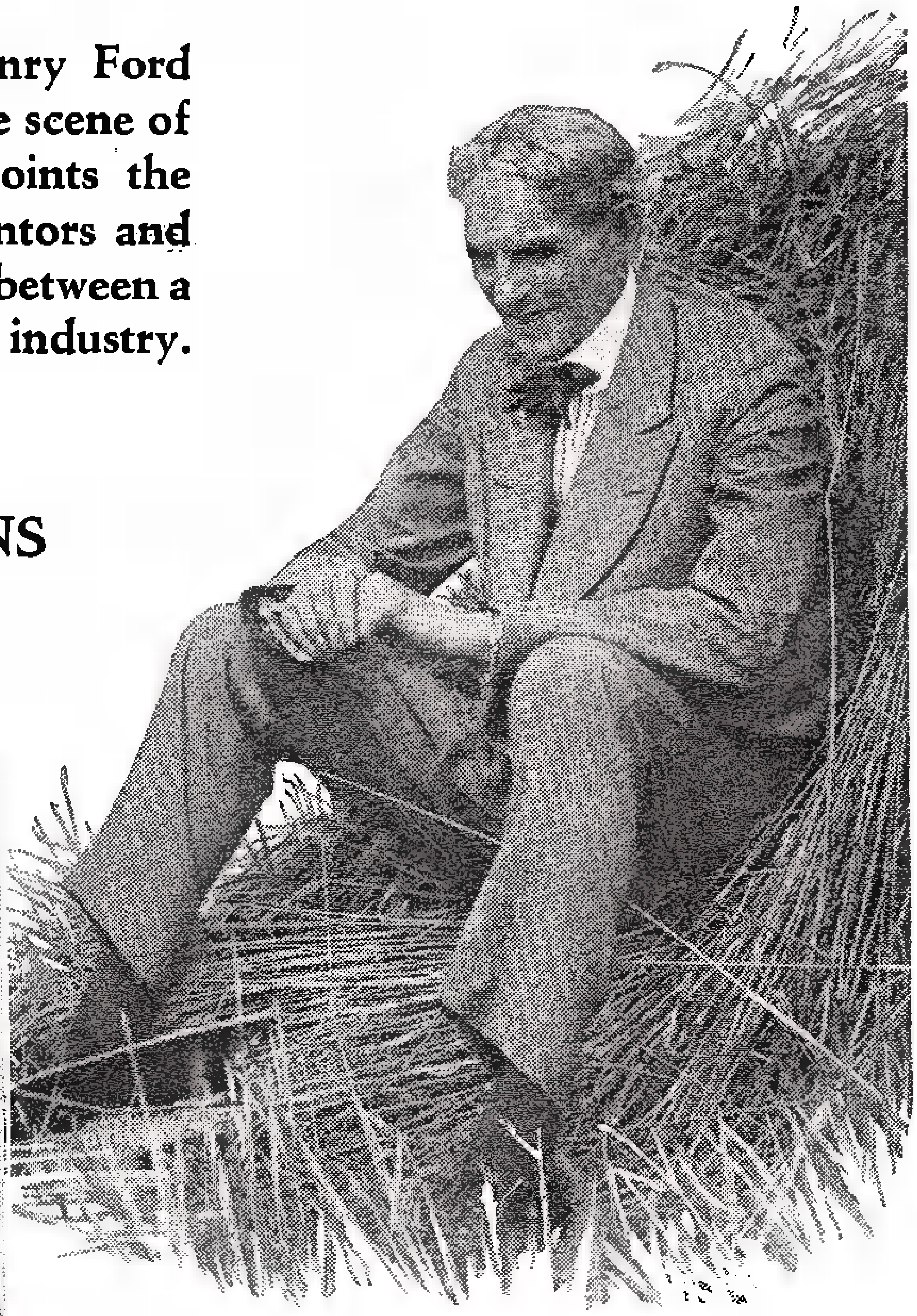
This material is as light as wood and some day may be as hard as steel. The ways in which this new Ford material may be employed are almost unbelievable. It has been developed to the point where it could be successfully used in making desks, chairs, and other furniture now in daily use. Ford and his chemists envision the time when automobile bodies, houses, skyscrapers and even great monuments may be fabricated from the soy bean.

Those who have the urge to create, to invent and to discover need not be bewildered by this picture of the future. Mr.

Discusses America's INDUSTRIAL FUTURE

In this exclusive interview Henry Ford predicts that the farm will be the scene of industrial development. He points the way to success for today's inventors and looks upon chemistry as the link between a more prosperous agriculture and industry.

by
GLENN F. JENKINS



This informal picture of Henry Ford resting in a field recalls his statement: "I have never worked so hard on anything as on the problem of reuniting farm and factory."

Henry Ford and his son are shown with first lathe, one of early power tools that turned out first Ford cars.

Ford hastens to explain that there is nothing complicated about the new technique. It is based on formulas that are not too complicated. The soy bean, for instance, contains fats, carbohydrates, and proteins. By a simple process of chemistry these are separated. The fat, or oil, is used for paints, lacquers, food stuffs, and countless other things. The protein or bean meal becomes the plastic raw material which can be shaped to suit many purposes. The molding technique, within easy reach of the ambitious experimenter, is not complicated and calls for only 2,000 pounds pressure and 350 degrees Fahrenheit.

But what of the unknown inventor? How does he fit into such a picture, Mr. Ford was asked. Things are done on such grand scales nowadays. Great laboratories have been built to solve the problems of mankind. In them are the polished minds of the schools. Brains have been regimented. Has the individual been hopelessly submerged? To this Mr. Ford gives an emphatic denial.

Genius, coupled with a desire to create something, to lessen drudgery and improve our modes of living, need not look far, according to Mr. Ford. He may start from scratch. Every inventor who amounted to anything had to do that. Edison had only two hands and one brain when he began to experiment with one thing and another. Ford had no better tools at his command 40 years ago when he made his first internal combustion engine out of a piece of waterpipe, an old flywheel, and some scraps of wire and iron. The contraption nearly wrecked the kitchen sink the first and only time he cranked it.

Chemistry is the magic word Mr. Ford would use to bring about the great developments he visualizes. It would in no way hamper mechanics, but would become another tool of industry. In those two fields, chemistry and industry, the chances for inventive genius to assert itself would be multiplied. In Mr. Ford's realm of activity agriculture and industry are inseparable partners and chemistry is the tie that binds them.

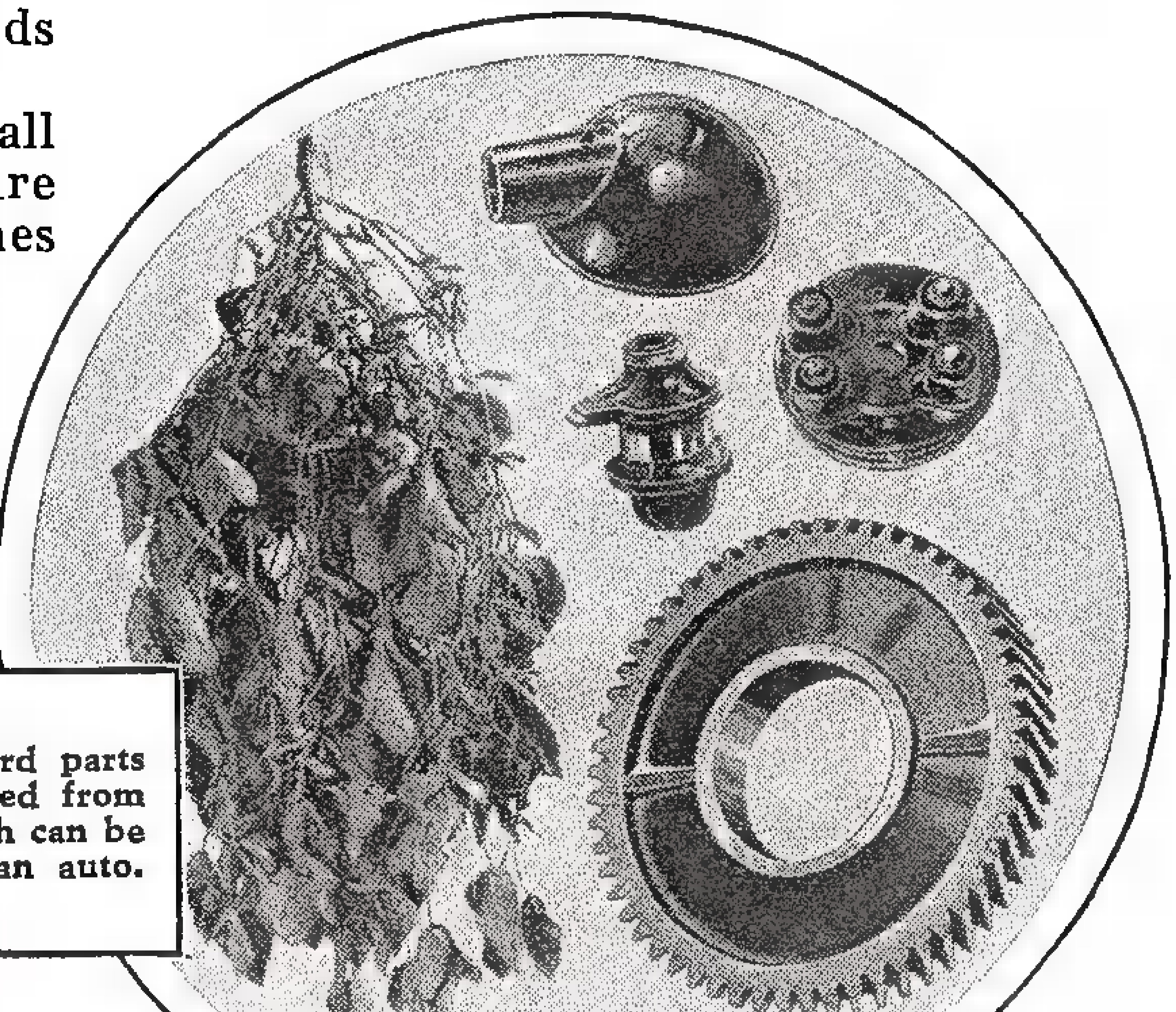
"I foresee the time when industry shall no longer denude the forests which require generations to mature, nor use up the mines which were ages in the making, but shall draw its raw material largely from the annual products of the fields," he declared.

"The dinner table of the world is not a sufficient outlet for the farmer's products; there must be found a wider market if agriculture is to be all that it is competent to become. And where is that market to be found if not in industry?

"I am convinced that we shall be able to get out of the yearly crops most of the basic materials which we now get from forest and mine. We shall grow annually many if not most of the substances needed in manufacturing.

"When that day comes, and it is surely on the way, the farmer will not lack a market and the worker will not lack a job. More people will live in the country. The present unnatural condition will be naturally balanced again. Chemistry will reunite agriculture and industry. They were allowed to get too far apart and the world has suffered by the separation."

It would be within reason to speculate on the possibilities that lie ahead for the ex-

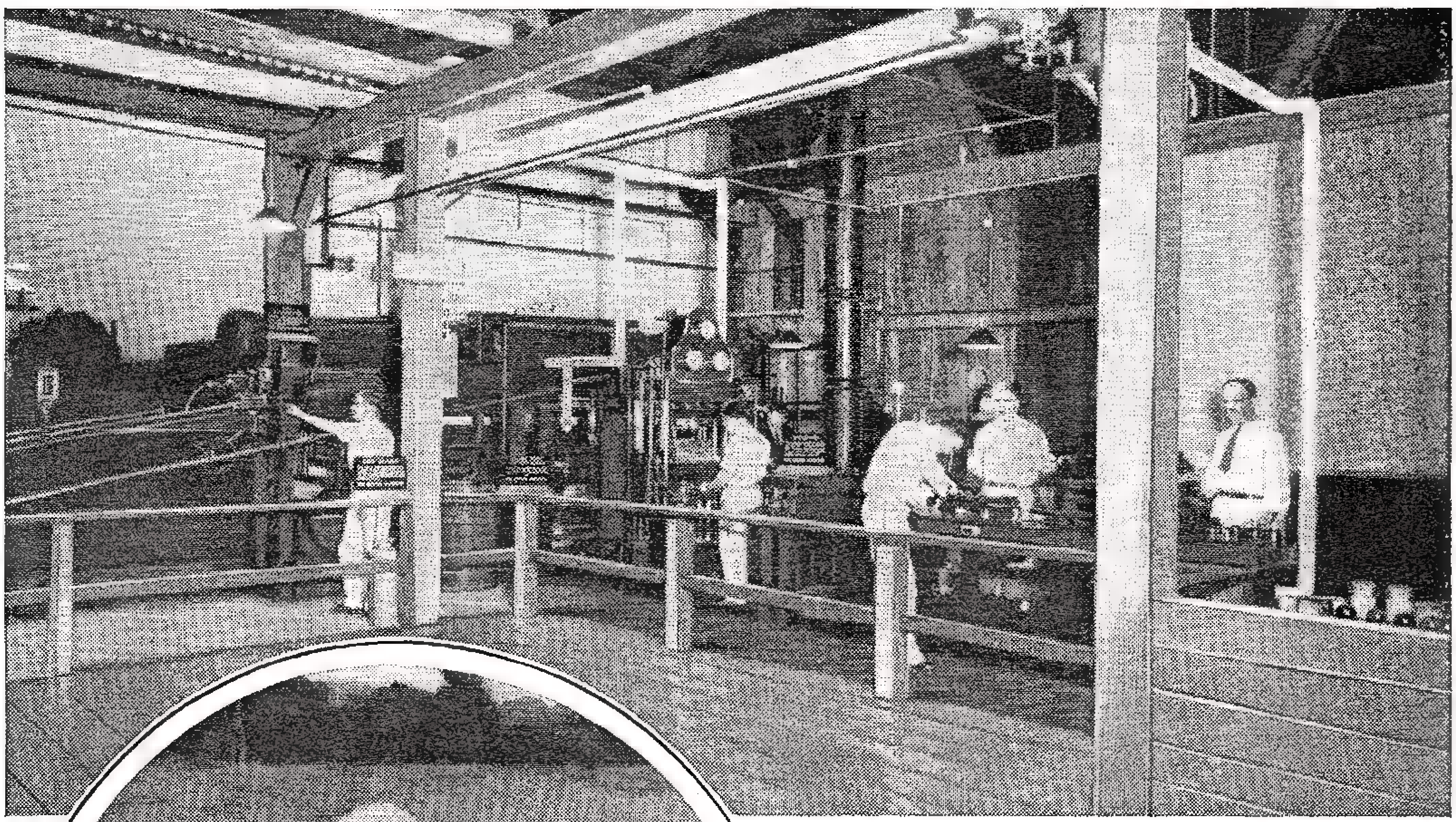


At right is the soy bean plant from which the Ford parts shown in the photo are made. The meal is extracted from the beans. This meal becomes a plastic material which can be molded into distributor heads and other parts of an auto.

FORD INDUSTRIALIZED BARN

Henry Ford exhibited this "industrialized barn" at the World's Fair to show how the farm can become the small factory of the future to manufacture semi-finished material.

Ford's "Industrialized Barn" Shows Simple Process of Farm Manufacture



This interior of Henry Ford's industrialized barn showed the simple steps and machinery involved in obtaining oils and other material from plants.

Here is Henry Ford inspecting plants on one of his farms. He has devoted 30,000 acres to experimental agriculture.

perimenter and inventor, but Mr. Ford does not do that. The young experimenter may do that for himself. He may peer into the future and not be surprised to envision many wonderful things. It is within the range of possibility that a formula and process as simple as that for breaking down the soy bean may be found to extract iron from ore. This could be done at the mines, saving vast sums in transportation costs.

This idea alone would be worth untold millions to the man who solved the problem of reducing low grade ores by an inexpensive method. It is worth thinking about. Cheaper raw materials would reflect themselves in every phase of industry. Uses for steel would multiply. Reduction of costs would stimulate building. New and simplified equipment would come into use. These are some of the things that are expected to take place. What a field for invention and discovery!

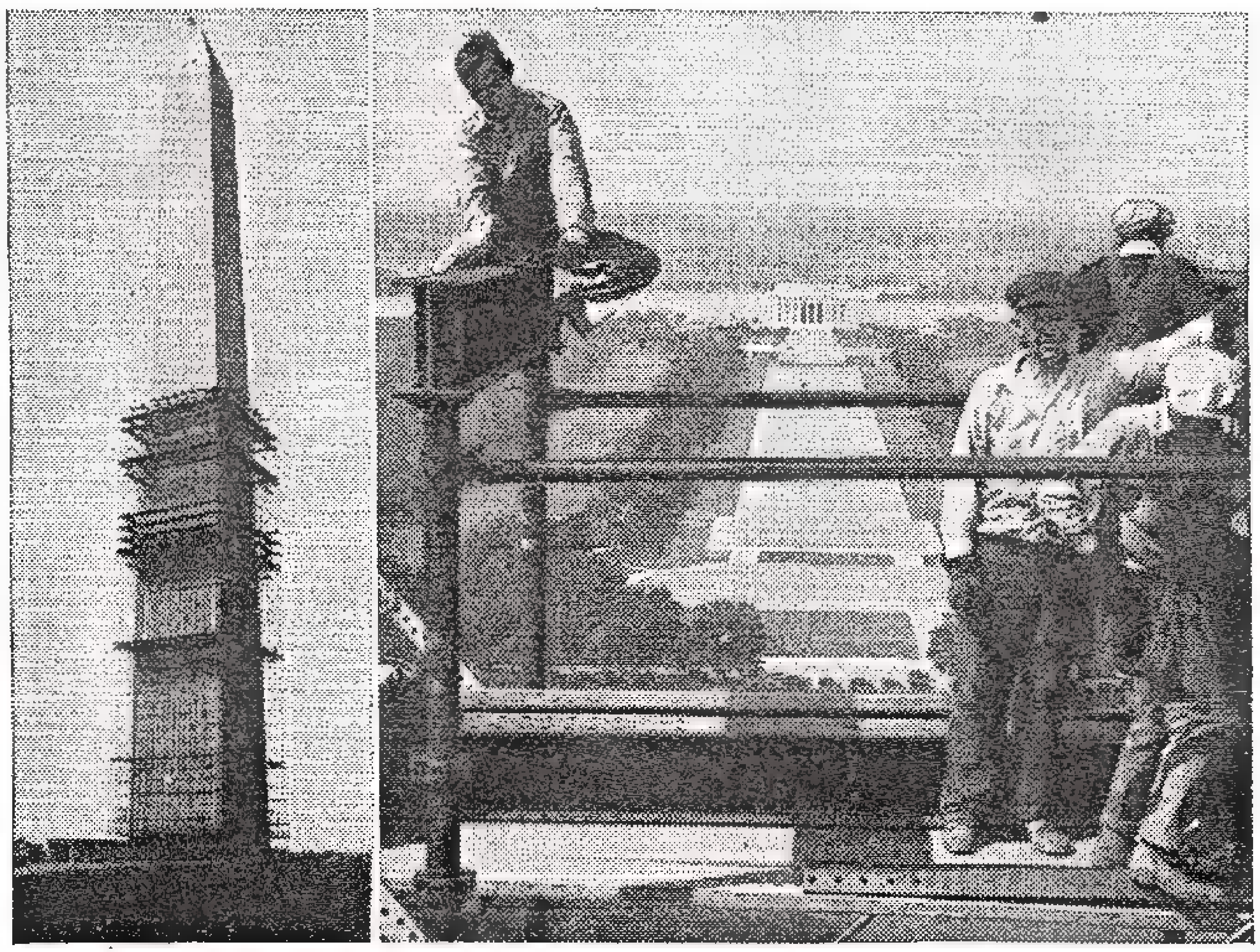
Chemists have found methods to convert beets, soy beans, sunflowers, goldenrod and many other plants into practical industrial products. In the back of Henry Ford's mind reposes this question: "Why would it not be possible to discover entirely new uses for other agricultural materials?" He believes it to be within the range of possibility to discover a new method of lightening man's burdens. It would be something that would not displace any valuable thing now in use, but would come into existence and find its proper place as did the automobile.

Who will make such a discovery? Mr. Ford is working in that direction and everyone has the opportunity of going along with him. He explained that the experiments he is making for new and less expensive materials are not for personal gain. He has made his fortune, and he wants the world to have the benefit of what he is now able to do in his laboratories. He is trying to lead the way out of a complicated mass of high costs and distorted ideas of how to make an abundant and joyous living.

On his farm tracts, which embrace more than 30,000 acres of Michigan land, Mr. Ford is producing annually great quanti-

(Continued on page 137)

Engineers Rear Scaffold to Save Washington Monument



Left—A view of the iron scaffolding, partially completed, which engineers built around the Washington Monument. Right—Closeup of one of the lofty working platforms, with Lincoln Memorial shown in the distance.

ALARMED by the continued chipping of stone endangering the famous Washington Monument (see MODERN MECHANIX AND INVENTIONS, May, 1934), engineers have erected a giant iron scaffold to accommodate workers who are repairing the horizontal joints in the masonry.

Repairs are to be effected by channeling or raking out the joints to a depth up to 1⅛ in., and filling the quarter inch channels with pointing mortar. This process is expected to halt chipping of the stones, many of which now rest directly upon each other as a result of crumbling of the original mortar.

The scaffolding is built of iron pipe and is so designed that no vertical weight falls upon the monument. To guard against rust stains on the stone, all scaffold bolts have been treated with lion oil, a paraffine base product.

Smith Shows Amazing Strength

LONG hours spent over forge and anvil have made Joe Price, blacksmith of Gloucestershire, England, a perfect example of the "mighty man" made famous by Longfellow's immortal poem. Feats of strength impossible for an ordinary man are child's play for Price, whose massive biceps and bulging forearms are the talk of the countryside. One of his favorite tricks is to grasp a 50 pound maul near the end of the handle and swing it like an ordinary hammer.

Joe Price, English blacksmith, demonstrates his amazing strength by using a 50-pound sledge as a tack hammer.

Wireless Supplies Permanent Wave

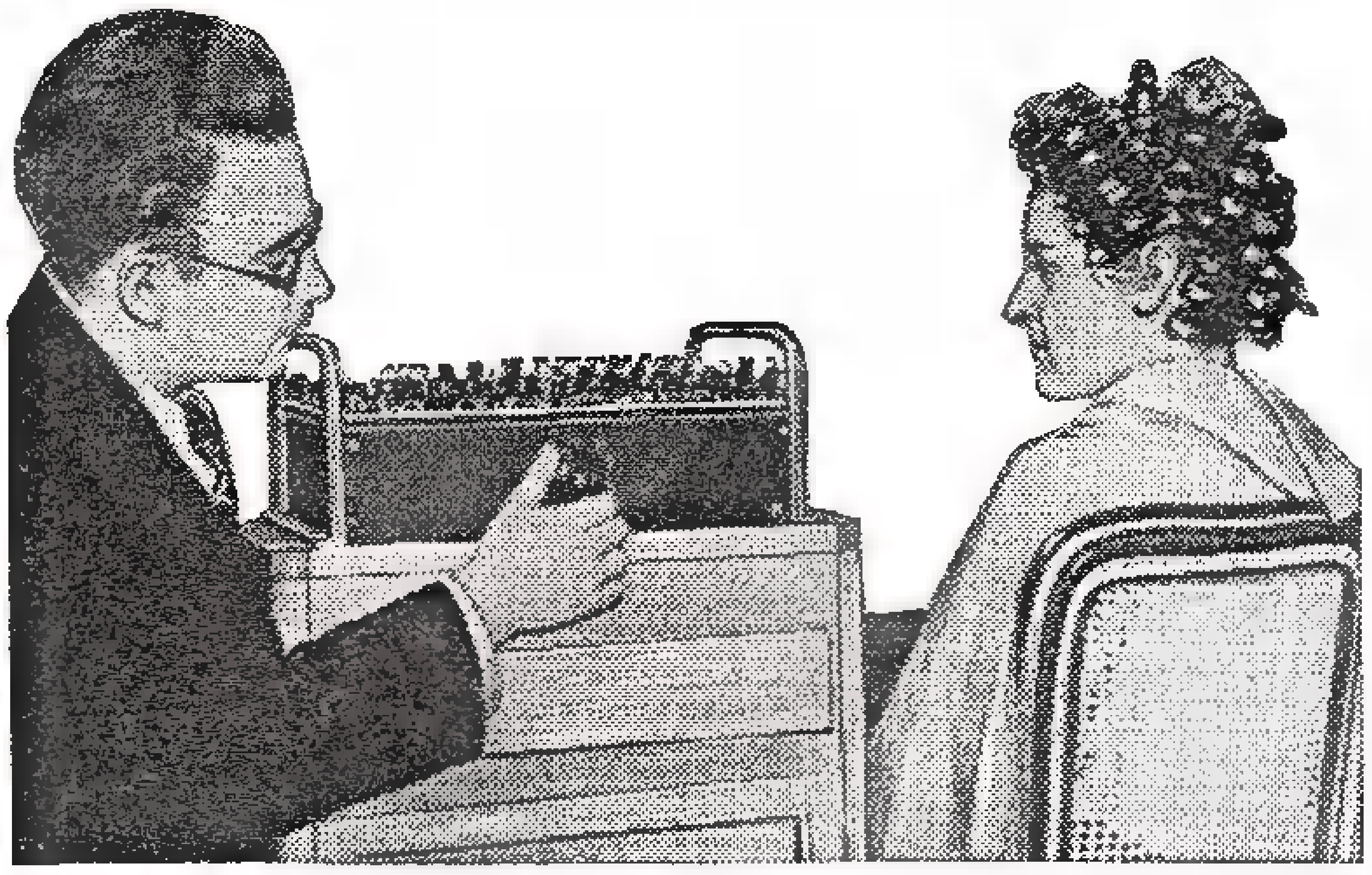


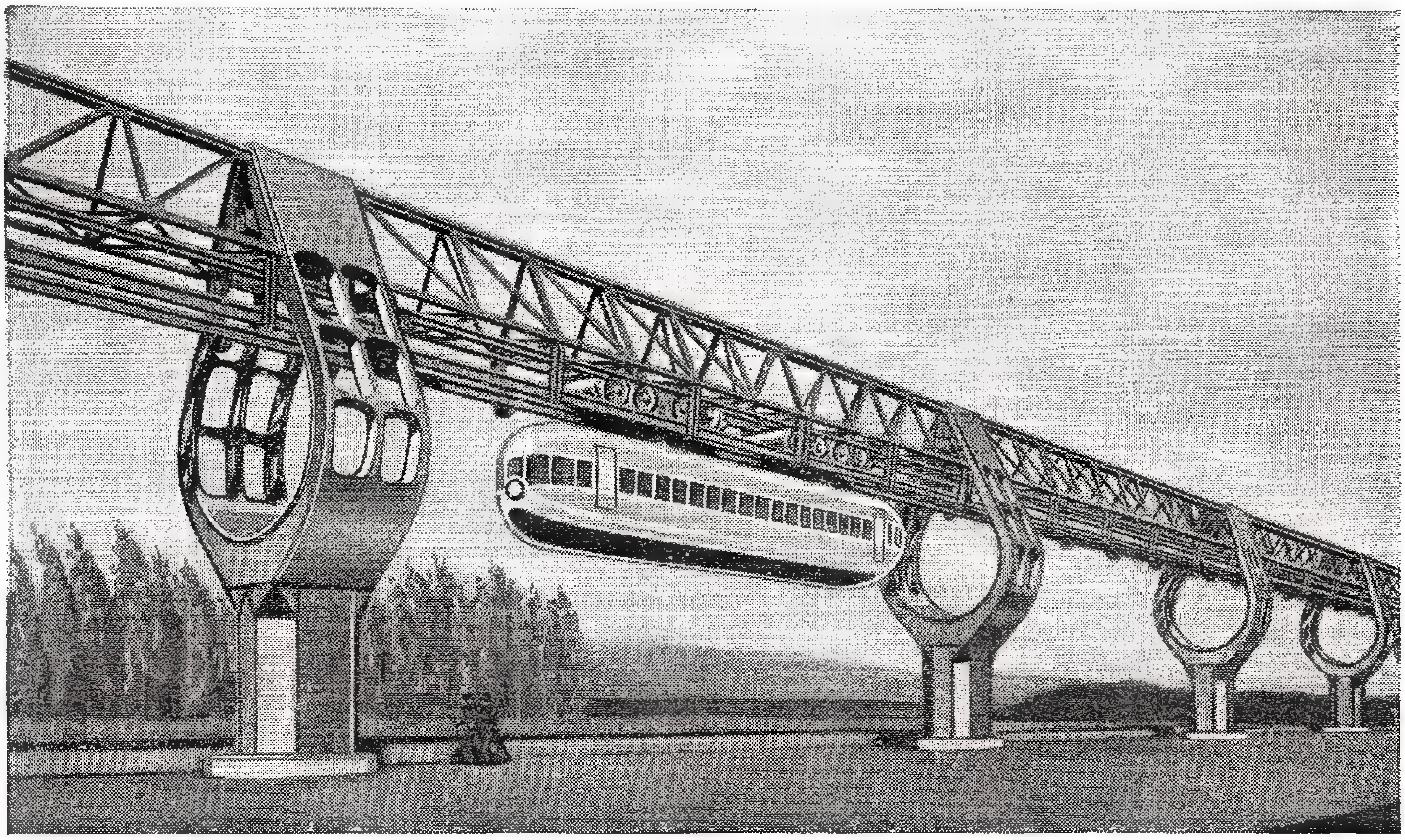
Photo shows patron receiving a permanent wave by wireless in English beauty shop. Heat is controlled by turning dial.

BEAUTY operators of London, England, recently introduced a new machine which furnishes a permanent wave by means of a wireless apparatus.

The revolutionary device eliminates the heavy, cumbersome wires common to the old method and marks a distinct forward step in assuring comfort to the patrons of the shop.

The heat necessary to impart a wave to the hair is supplied from a machine placed close to the subject. No wires connect this machine with the curlers. The volume of heat is under control of the operator at all times, by means of a knob which acts in the same manner as the tuning dial of a radio set.

Coast AIR TRAM to Make 100 M. P. H.



The drawing above shows how the air tram proposed for the San Francisco bay area would look when completed. A modification of the European monorail idea, the system is expected to attain a speed of 100 m.p.h. with safety.

PLANS for an air tram system capable of attaining speeds of 100 m.p.h. were recently outlined by Joseph B. Strauss, chief engineer of the Golden Gate bridge and highway district, as a means of solving the rapid transit problem in the San Francisco bay area.

The air tram proposed by Strauss is a modification of the European monorail system, but uses two rails for traction plus a third which conveys power and acts as a guard.

According to Strauss, the system might be applied to the Golden Gate bridge by suspending it beneath the structure, without encountering unusually difficult engineering problems and would deliver airplane speed with surface safety.

Grinder Reclaims Broken Drills

RE-POINTING broken or badly burned drills is said to be a simple task with a new, rapid bench-type grinder which eliminates haphazard methods of hand grinding.

During the operation the chuck is swung up and down to produce the proper lip form, while at the same time the cross-slide carries the chuck forth and back so that the drill keeps the face of the wheel true.

The grinder is made to fit all drills from 1/16 to 1/2 inch in diameter and produces the drill points recommended by manufacturers.

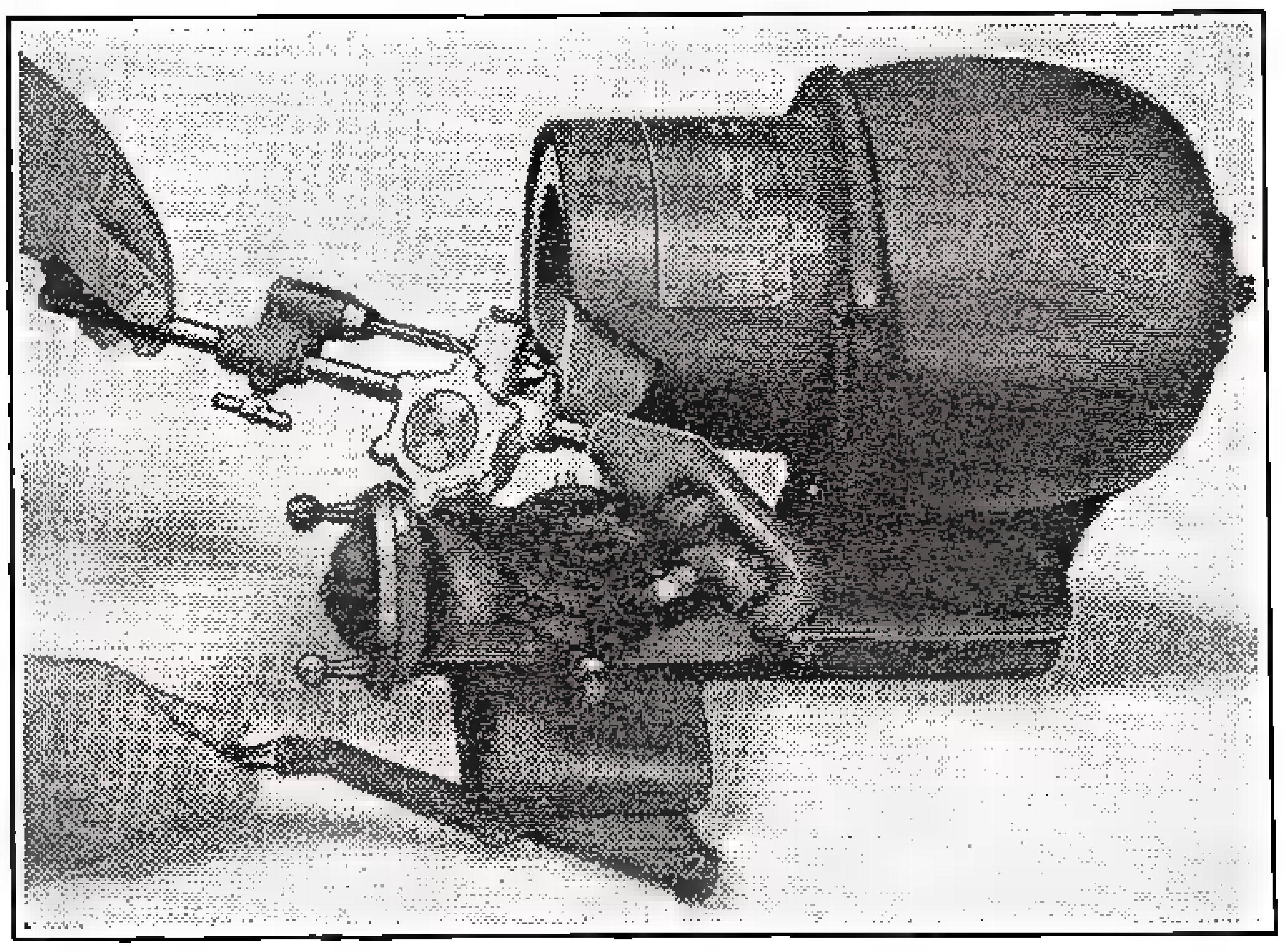
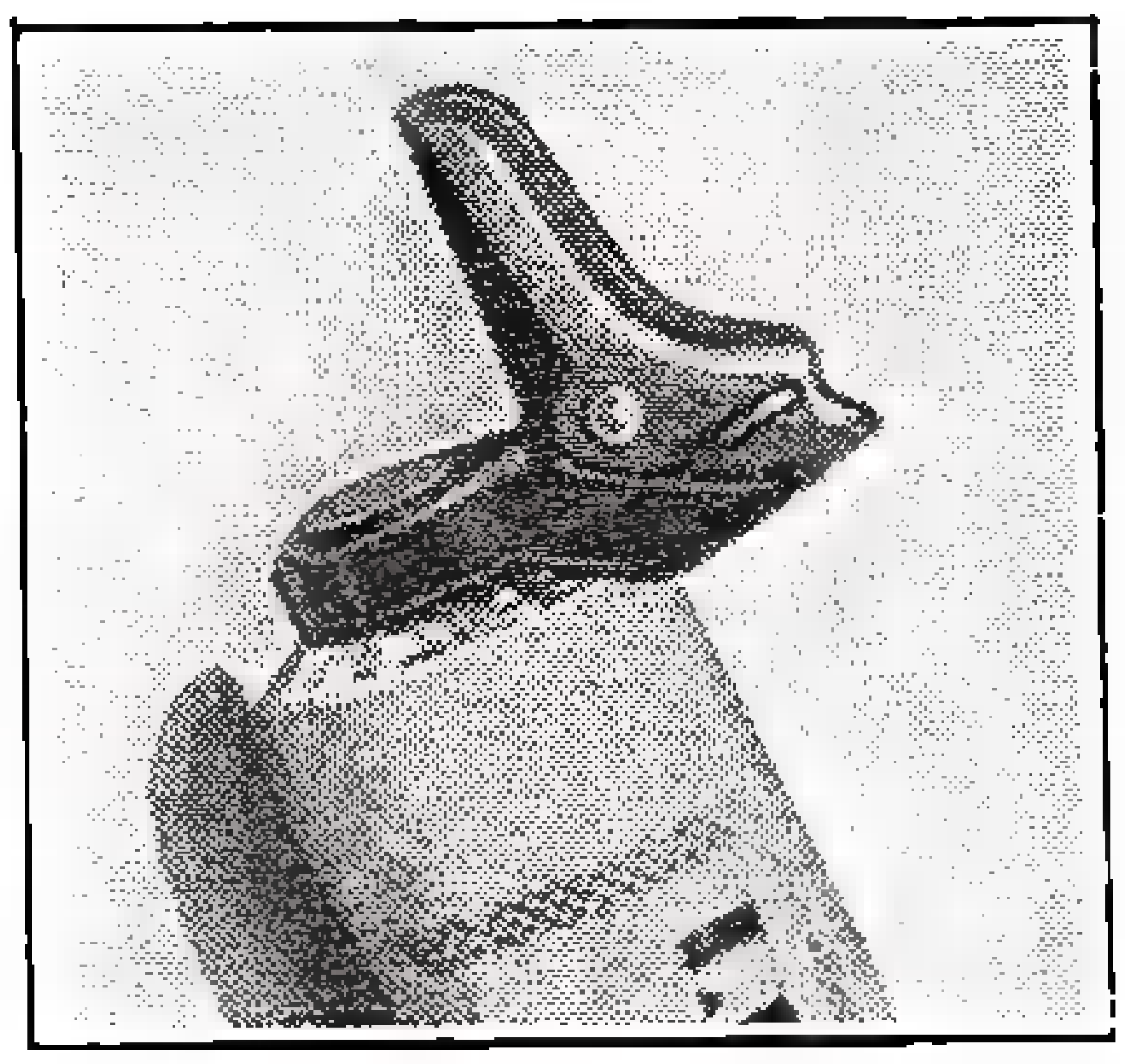


Photo shows the new bench-type grinder which re-points broken or burned drills from 1/16 to ½ inch in diameter.

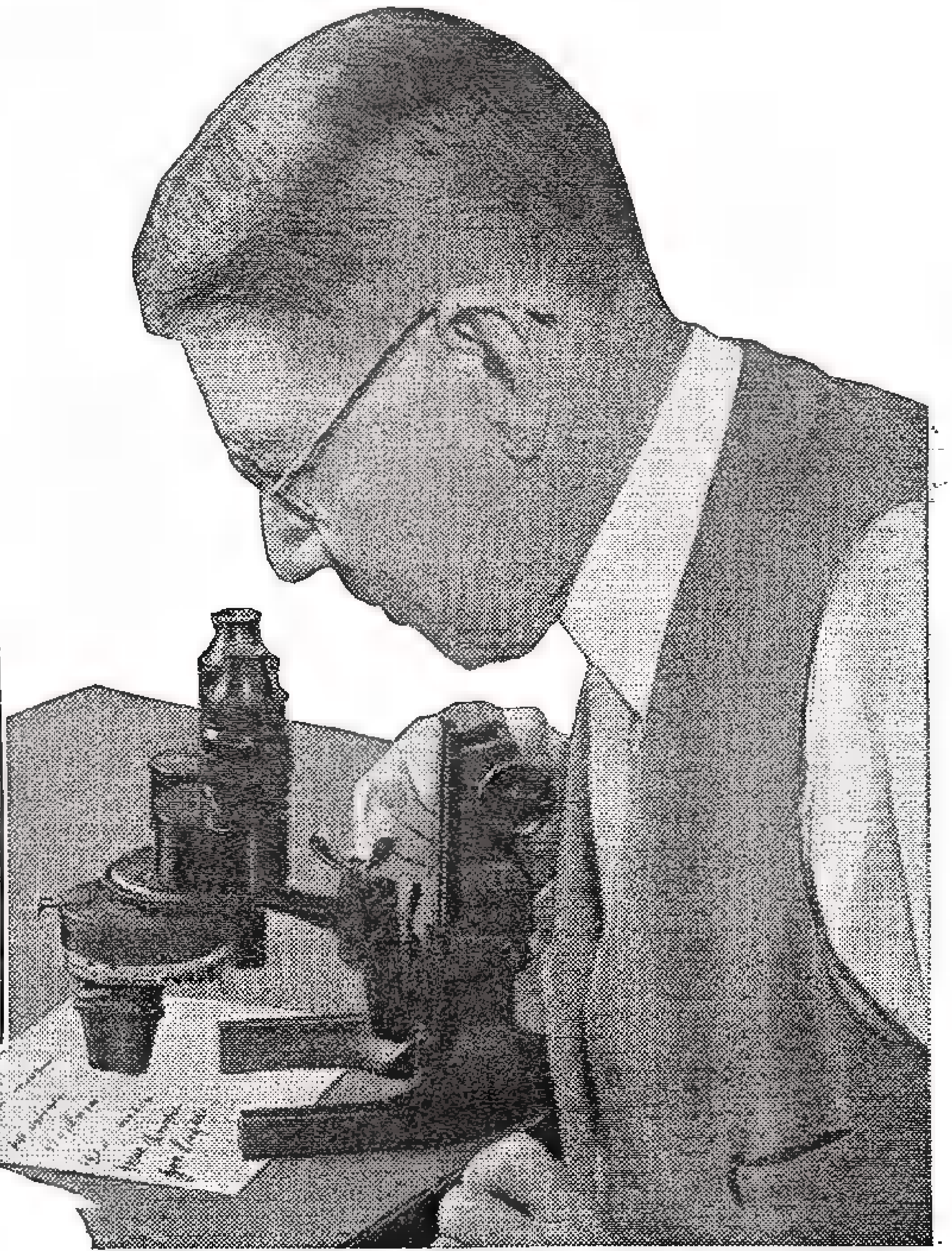
Device Stops Loss of Tube-Cap

DESIGNED to eliminate annoyance, a new hinged cap for commodities sold in tubes has recently appeared. The new cap is easily opened, snaps shut when laid down and is virtually loss-proof.



Hinged tube-cap is easy to open and snaps shut when laid down.

How SCIENCE TRAPPED



Above—Albert Osborn, handwriting expert who, after study of ransom notes and Hauptmann's writing, declared both were written by the same man. Right—B. C. Farrar, a government expert who, before Hauptmann's arrest, said the writer was a German carpenter.

by PETER LEVINS

NEVER has science played a larger part in a criminal investigation than in the Lindbergh kidnaping case. From the very night that Charles A. Lindbergh, Jr., was stolen from his crib in Hopewell, N. J., the best scientific brains of the nation have been at work on the meagre clues left by the murderer.

Investigators simply had to call in the laboratory experts. The clues were so few that ordinary police work would not avail. All the authorities had as evidence were the ladder used by the kidnaper to reach the nursery; the carpenter's chisel found near the ladder on the Lindbergh estate; the ransom notes; and, finally, the ransom bills that turned up in New York and vicinity.

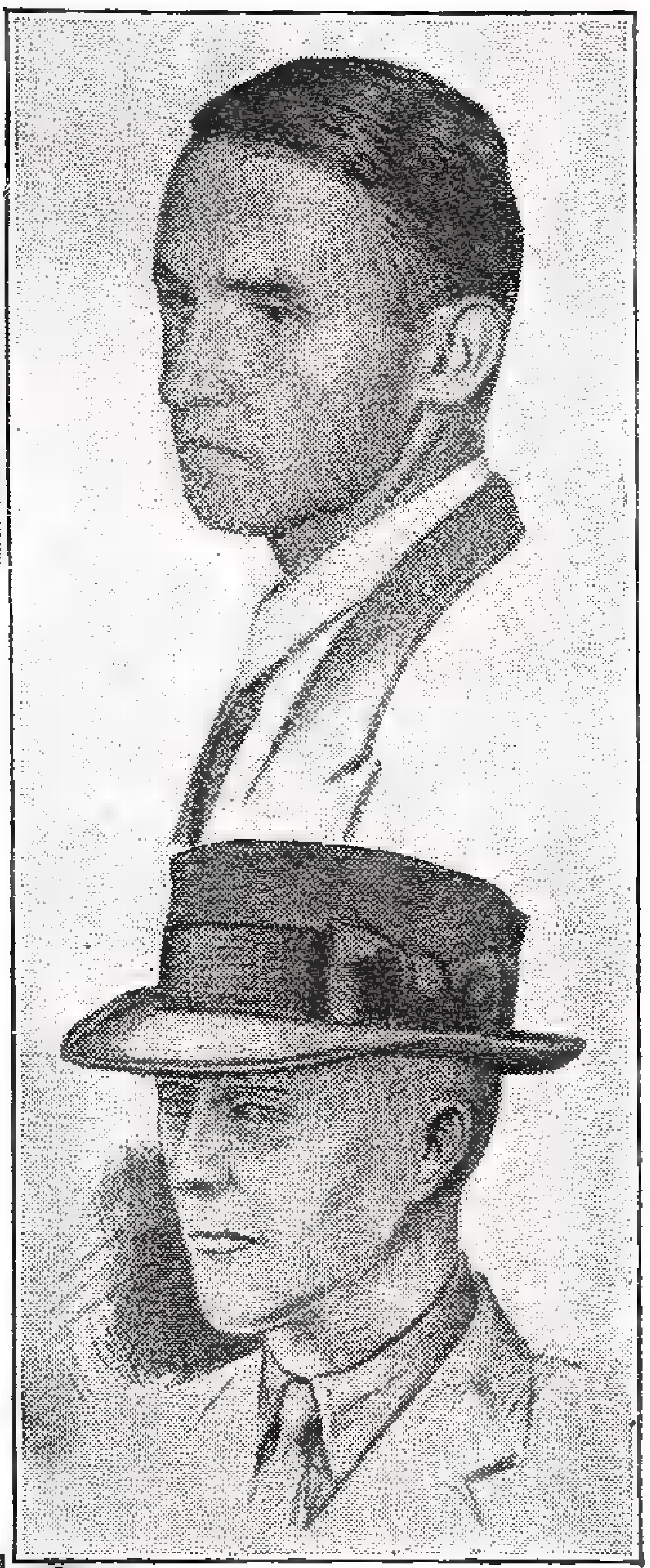
Every known device of science was used to reproduce, from this scanty evidence, the figure of the mysterious "John the Kidnaper." That he was reproduced to a most startling degree constitutes a real triumph in modern detective work. The ransom money finally led to Bruno Richard Hauptmann, German carpenter. It is not at all unlikely even if the ransom money had not led to this suspect, police would have been able to seize the kidnaper through the scientific evidence gathered from the ladder, ransom notes and money.

Before Hauptmann was arrested police had a good picture of the man suspected of the kidnaping. As a result of researches of scientists, they knew their man was a carpenter and a German who probably lived in the Bronx. They knew that the person, who had the ransom money, had buried or hidden it. Even the general features of the man were known through a composite picture drawn by an artist in the Department of Justice from descriptions gathered from scientists and from Dr. John (Jafsie) Condon, the intermediary who delivered $50,000 to the kidnaper in a New York cemetery.

The expert who tackled the seemingly impossible task of tracing the lumber used in the construction of the ladder was Arthur Koehler of the United States Forest Products Laboratory at Madison, Wis. Koehler is the leading man in the country in this line of work.

Purely by laboratory methods, combined with his own extensive knowledge of wood, he can find out as much about a piece of lumber as a medical expert can discover by an autopsy on a human body. His tests determine exactly in which forest a certain fragment of wood originated. His microscope picks out every single mark or inden-

Lindbergh Kidnap Suspect



Above—keg of nails found in Hauptmann's garage. The nails are said to be similar to those used in the kidnaping ladder. Right—Photo of Hauptmann and below composite picture drawn before his arrest. Note the resemblance. Right below—Col. Lindbergh, with police guard, entering grand jury room.

tation. He can tell whether a hammer used in a piece of work was worn on one side, or otherwise marked. He can distinguish every infinitesimal flaw in the cutting edge of a chisel or saw.

He declares that every tool makes a mark as individual as a human fingerprint.

After studying the fibre of the wood used in the ladder, Koehler traced the wood to a particular forest in California. From the forest he traced it to the mill that cut it. And from the mill he traced it—though this final phase of the search took many months—to the National Millwork and Lumber Corp., White Plains Road, the Bronx, where, it later developed, Bruno Hauptmann had worked.

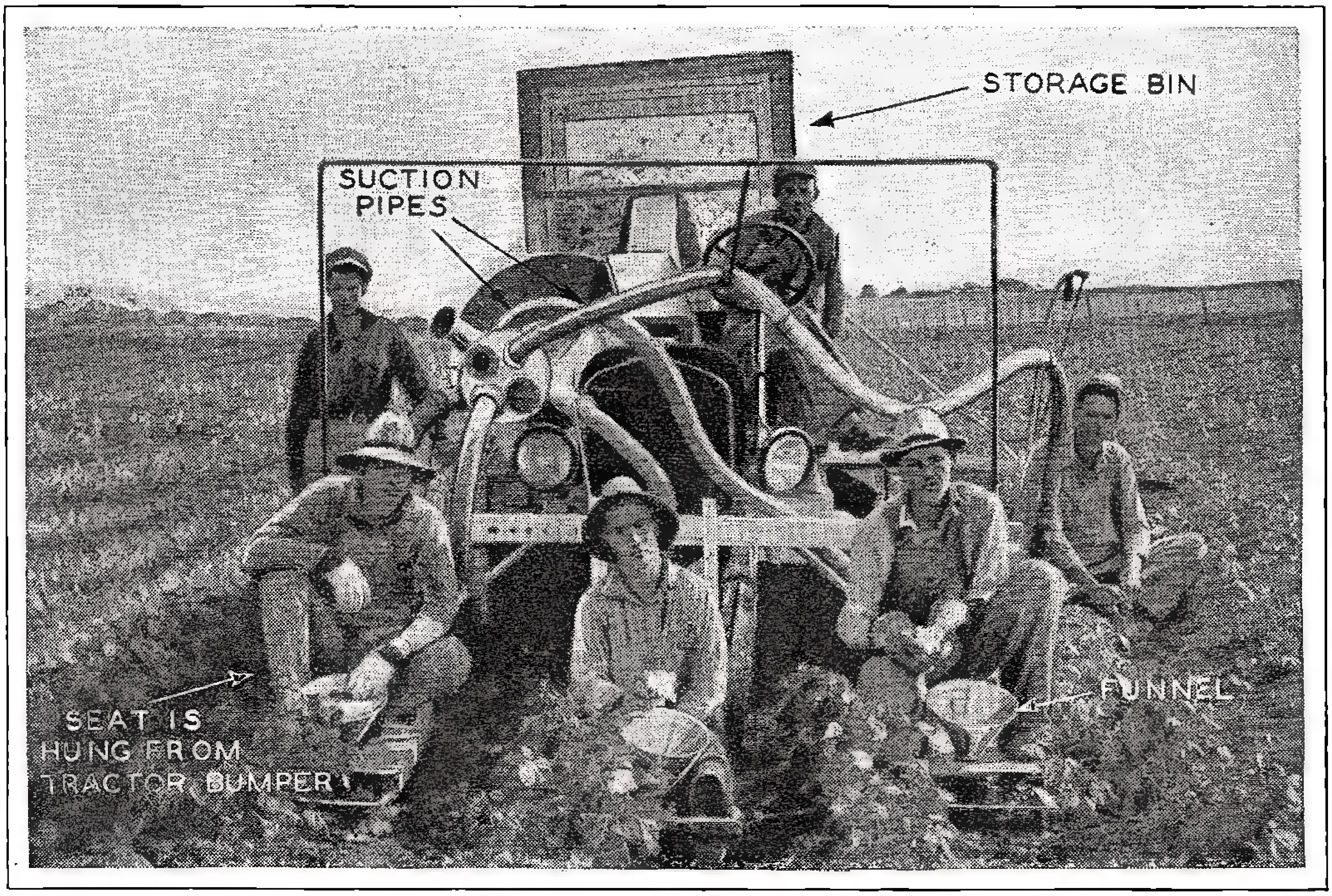
A major achievement, this. And done almost exclusively in the laboratory.

After Hauptmann's arrest Koehler set up a laboratory in New Jersey and set about tracing every stick of wood used in the construction of the suspect's garage, where so much of the ransom money was dug up by the police.

The ransom notes produced a mine of information when subjected to the examination of experts. Very early in the case, even before the child's body was found, B. C. Farrar, handwriting expert of the United States Treasury, told Colonel Lindbergh that the writer of the notes was a methodical German carpenter. The habit of combining words—"sleepingsuit," for instance—was

(Continued on page 140)

Vacuum-Type Harvester Eases Cotton Picking Labors



Seated on perches a few inches above the ground, workers pick cotton bolls and drop them into funnels. Suction draws the cotton through metal hose into the blower where the staple is separated from burrs and carried to trailer.

OPERATING on the principle of a vacuum cleaner, a cotton harvester retains certain manual operations but eliminates drudgery for the workers.

The device consists of lengths of funnel-tipped metal hose attached to a tractor whose engine powers the harvester's blower. Seated a few inches above the ground on perches hung from the tractor's bumper, the workers drop the cotton bolls into the funnels. Suction draws the cotton into the blower where the staple is separated from the burrs and carried to a trailer.

If the cotton is to be picked from the bolls, the funnels are replaced by nozzles. Guided by hand, these are placed against the bolls, suction plucking the staple.

Electric Reel Has Varied Uses

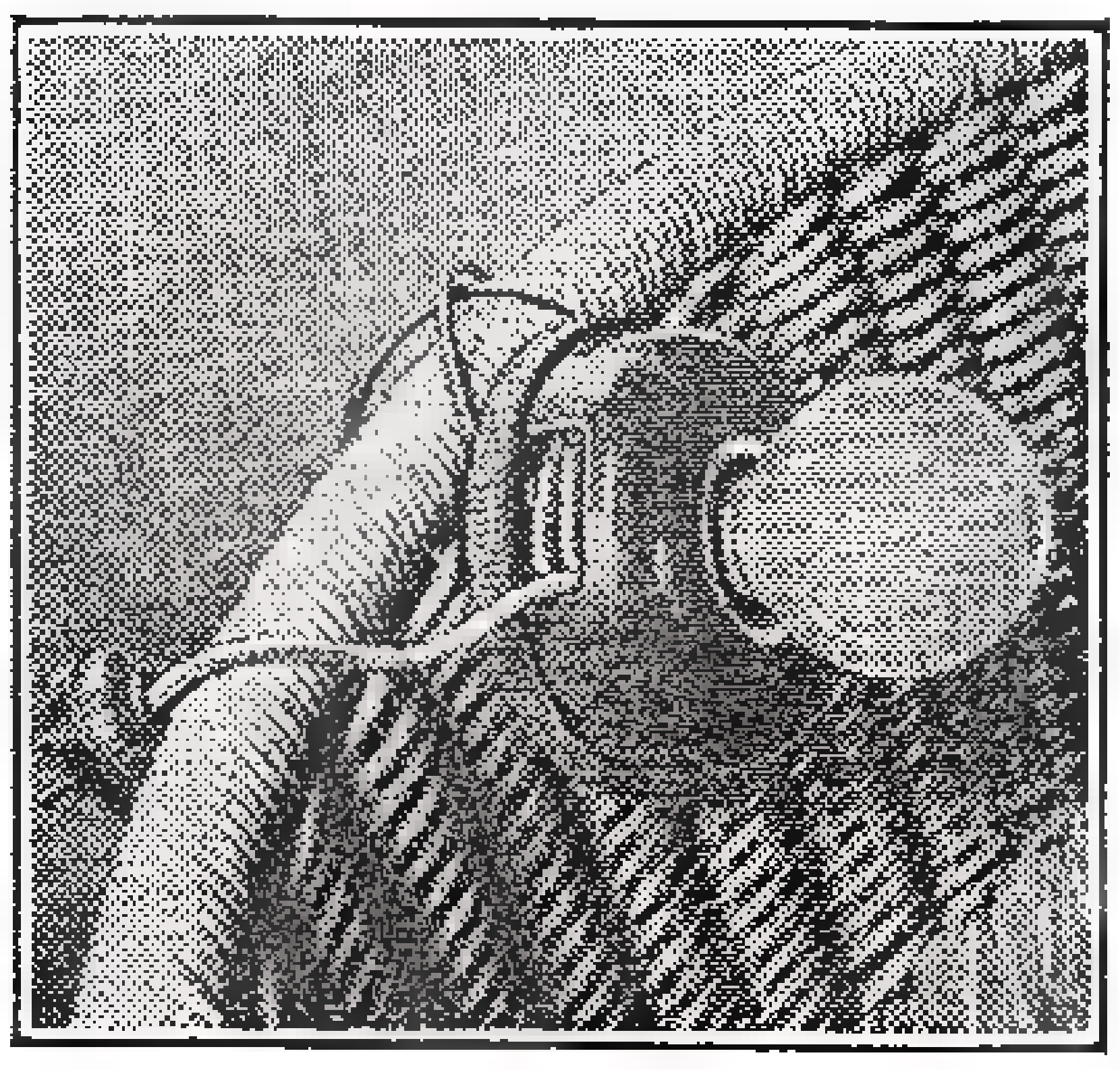
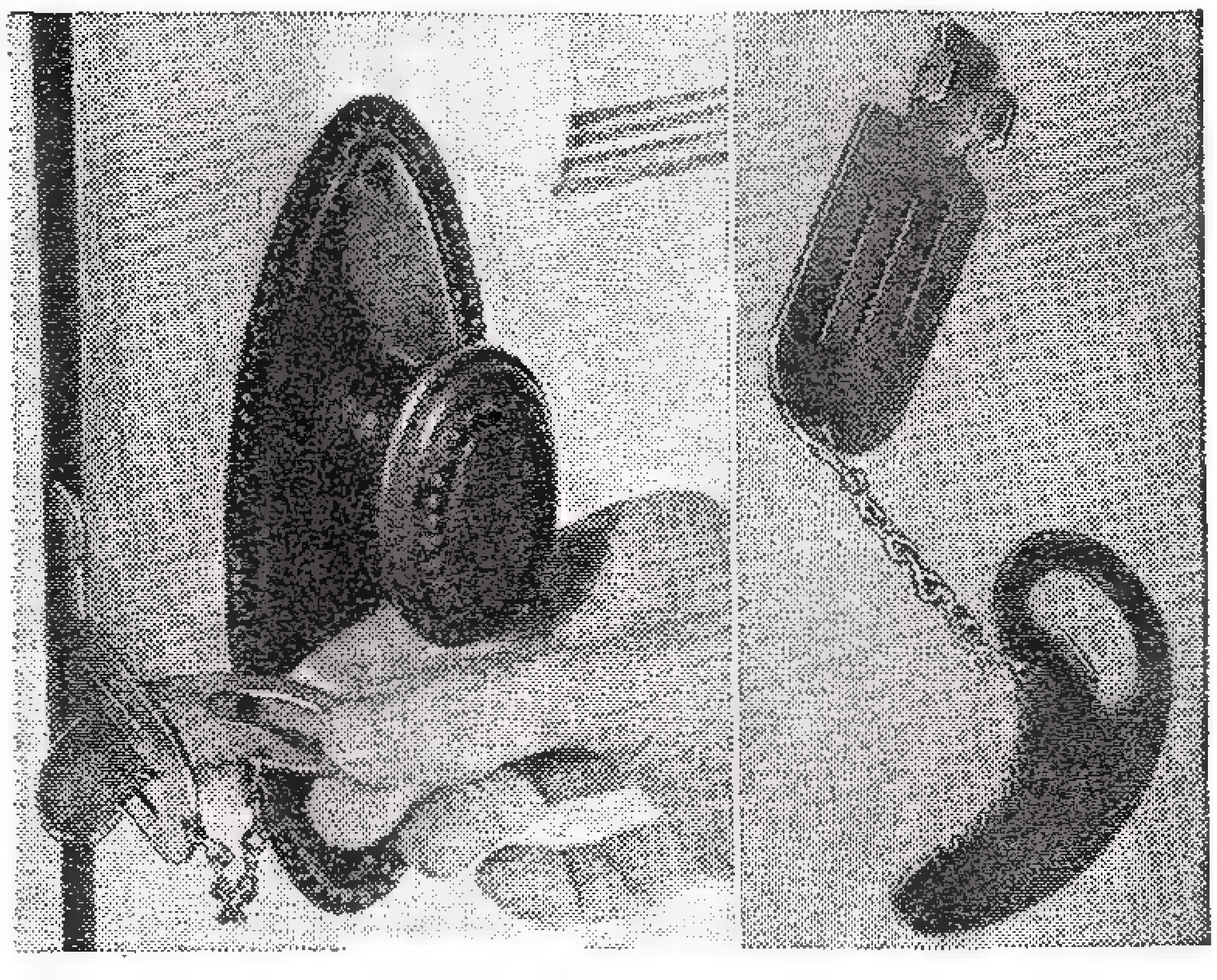


Photo shows reel and socket clamped in place on a chair.

A NEW electric cord reel simplifies the job of making connections for lamps and accessories. The compact device contains 15 feet of flexible wire and is fitted with clamps for attaching in any desired position.

New Lock Guards Traveler's Door

TRAVELERS who find the locking equipment inadequate on their hotel doors may insure privacy with a simple device consisting of two metal plates connected by a short length of chain. One plate has a set of slots and two hooks to be inserted into the lock hole of door jamb. With this plate in place the door is closed and the second metal piece is forced into one of the slots, preventing the door from being opened.



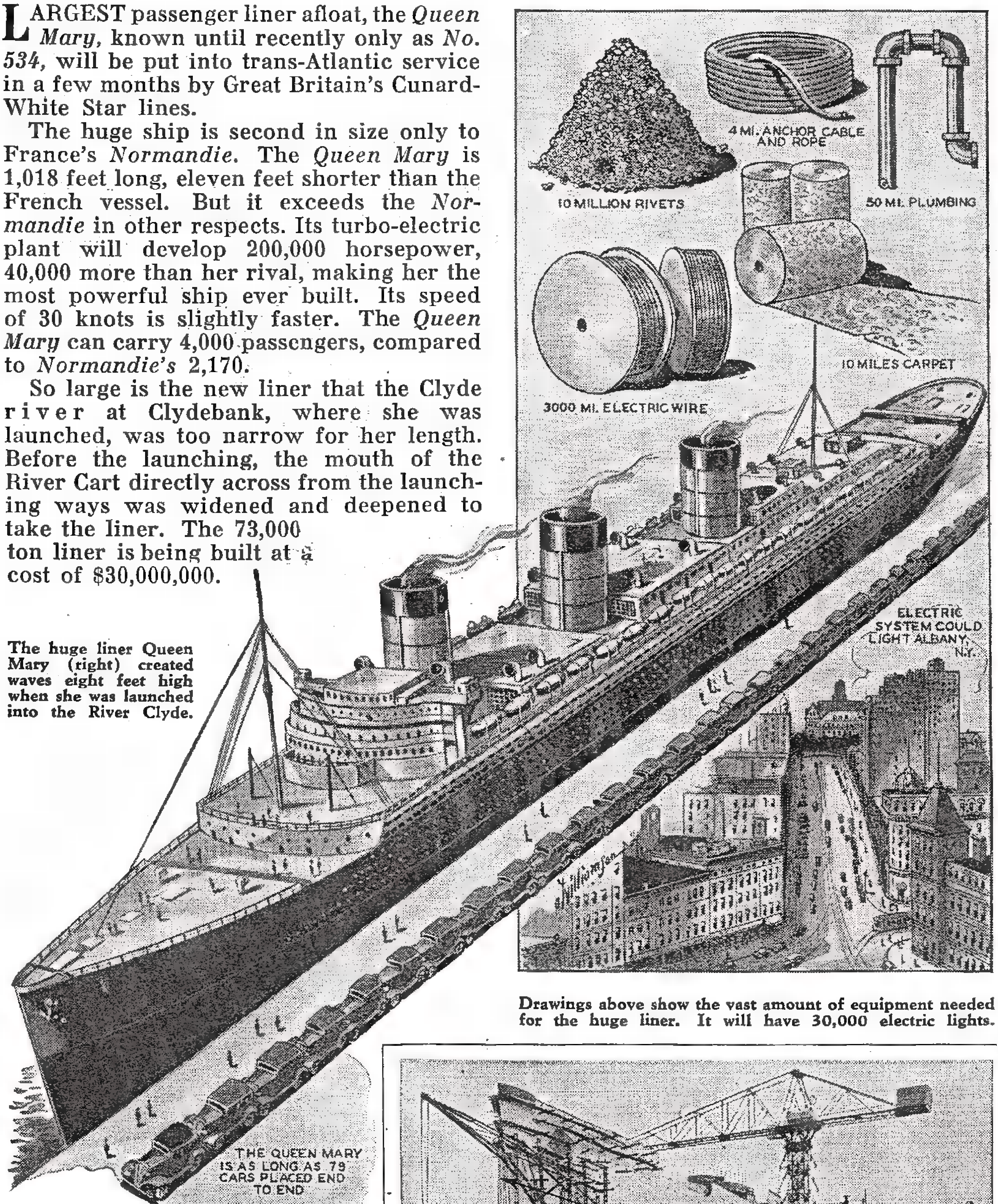
Inserted in slot of metal piece anchored in door's lock hole, notched guard binds, preventing door from opening.

Greatest PASSENGER LINER Launched

LARGEST passenger liner afloat, the *Queen Mary,* known until recently only as *No. 534,* will be put into trans-Atlantic service in a few months by Great Britain's Cunard-White Star lines.

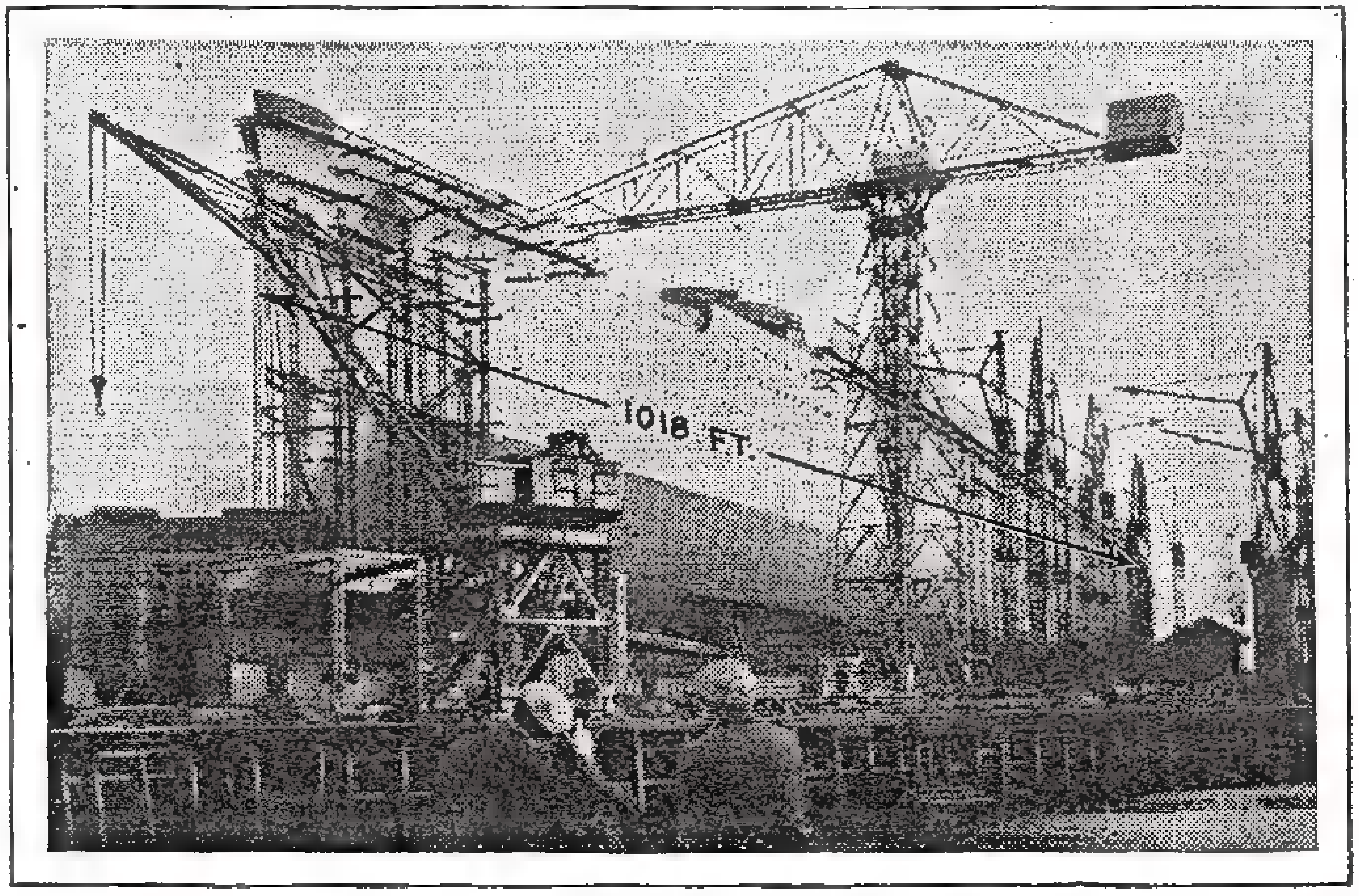
The huge ship is second in size only to France's *Normandie.* The *Queen Mary* is 1,018 feet long, eleven feet shorter than the French vessel. But it exceeds the *Normandie* in other respects. Its turbo-electric plant will develop 200,000 horsepower, 40,000 more than her rival, making her the most powerful ship ever built. Its speed of 30 knots is slightly faster. The *Queen Mary* can carry 4,000 passengers, compared to *Normandie's* 2,170.

So large is the new liner that the Clyde river at Clydebank, where she was launched, was too narrow for her length. Before the launching, the mouth of the River Cart directly across from the launching ways was widened and deepened to take the liner. The 73,000 ton liner is being built at a cost of $30,000,000.


10 MILLION RIVETS
4 MI. ANCHOR CABLE AND ROPE
50 MI. PLUMBING
10 MILES CARPET
3000 MI. ELECTRIC WIRE
ELECTRIC SYSTEM COULD LIGHT ALBANY, N.Y.
THE QUEEN MARY IS AS LONG AS 79 CARS PLACED END TO END

The huge liner Queen Mary (right) created waves eight feet high when she was launched into the River Clyde.

Drawings above show the vast amount of equipment needed for the huge liner. It will have 30,000 electric lights.



At right is the Queen Mary in the ship yard before launching. The ship was named in honor of Queen Mary who, with the King of England, took part in launching ceremonies. At time of launching the Queen Mary weighed 34,000 tons. A 300 ton gyro steadies her in rough seas and simplifies steering.

$500.00 CASH PRIZES

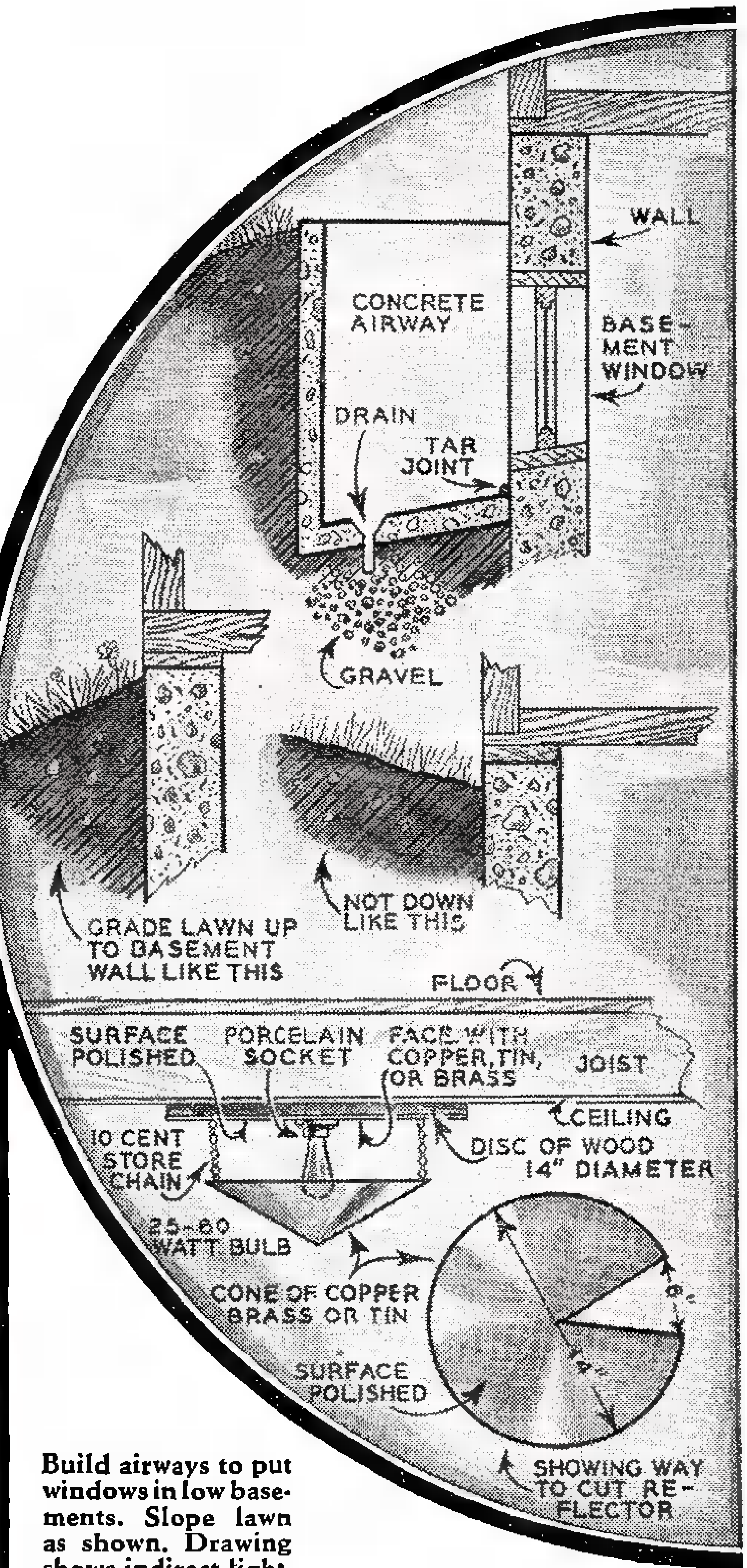
Fifty-six prizes, $500 in cash, await readers of Modern Mechanix and Inventions in a series of four monthly contests. Each contest will differ from the other. In each one 14 prizes totaling $125 will be awarded. In all four contests readers will have an opportunity to win 56 prizes or $500 in cash!

This month 14 prizes, totaling $125 in cash, will be awarded to the best suggestions received on improving a home. Tell as briefly as possible how you would convert an attic into a den, a porch into a sun parlor, an ordinary frame house into a colonial type home, or any one of dozens of possible improvements. You don't have to own a home to enter this contest.

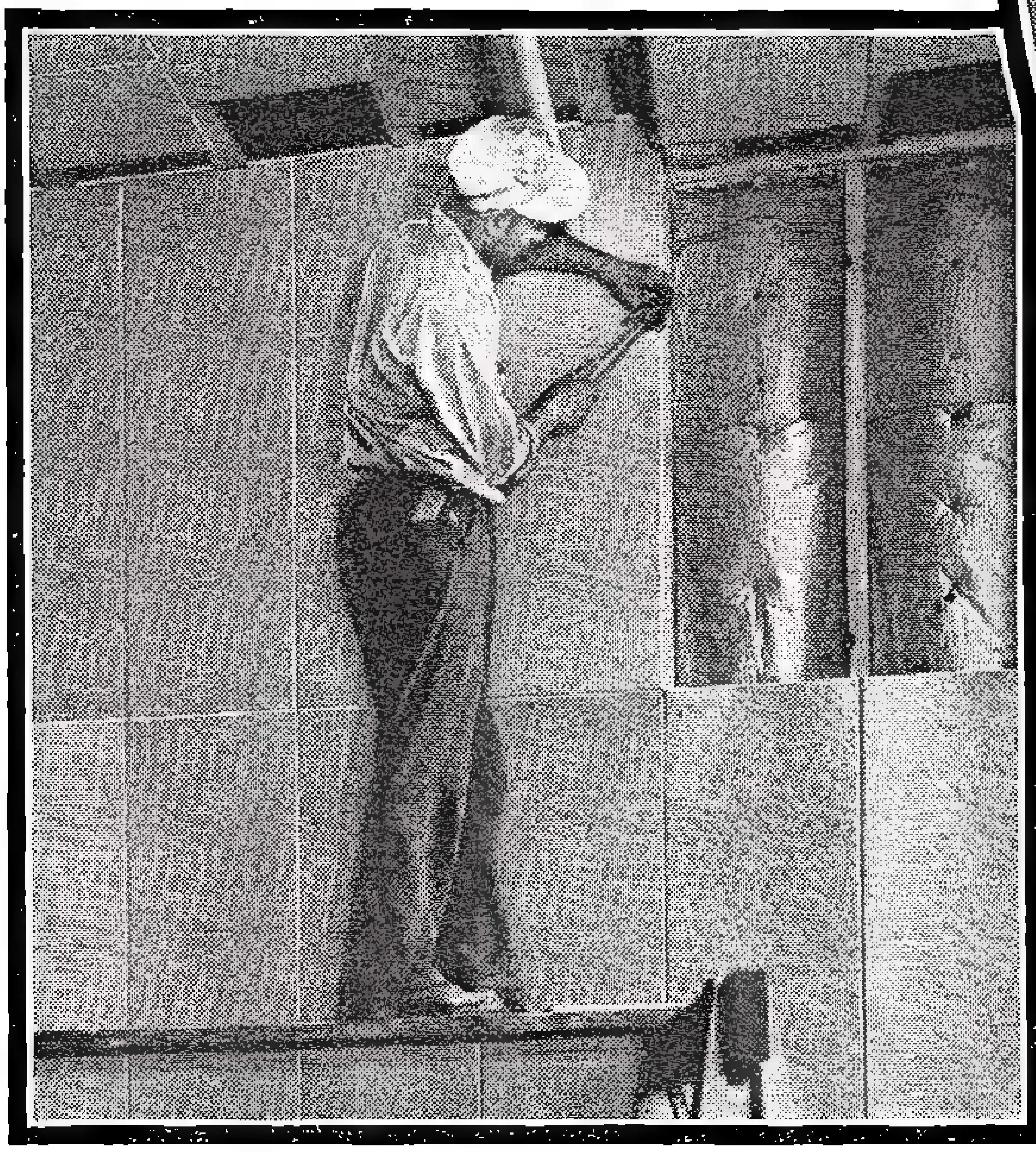
In your entry describe briefly how you would carry out the construction steps involved in remodeling some part of the house. You will find it easier to confine your entry to one section of the house, such as the porch, the attic, basement or roof. Read the rules on the next page. The following article will give you some idea on how to prepare your entry.

by DALE R. VAN HORN

DINGY basements can be converted into luxurious living room or recreation room quarters with such ease and economy that it is becoming the smart thing to do.


WALL
CONCRETE AIRWAY
BASE-MENT WINDOW
DRAIN
TAR JOINT
GRAVEL
GRADE LAWN UP TO BASEMENT WALL LIKE THIS
NOT DOWN LIKE THIS
FLOOR
SURFACE POLISHED
PORCELAIN SOCKET
FACE WITH COPPER, TIN, OR BRASS
JOIST
CEILING
10 CENT STORE CHAIN
DISC OF WOOD 14" DIAMETER
25-60 WATT BULB
CONE OF COPPER BRASS OR TIN
SURFACE POLISHED
SHOWING WAY TO CUT RE-FLECTOR

Build airways to put windows in low basements. Slope lawn as shown. Drawing shows indirect light.



Tack wallboard panels to 1x2" furring strips which are fastened to the cement basement wall with toggle bolts or cement nails.

Surprising results can be obtained as shown by the accompanying photographs.

By simply furring the walls and floor and using any one of several suitable materials for the finish the base-

SEE JANUARY M-M

for HOME Improvements

This basement was converted into a pleasing den at little cost. The fireplace is covered with log siding and the walls with pine boards finished in their natural color.

This attractive basement has an artificial fireplace, natural wood finish, patterned ceiling.

ment becomes a suitable place in which to live. Finished with patterned, paneled wall board, you can have a basement that you will be proud to show to anyone. The simplest treatment is merely to waterproof the walls, then paint or kalsomine them, cover the ceiling with wall board, then paint or varnish the floors.

You will enjoy planning a subdivision of the basement into a group of attractive rooms. Before undertaking the work, repairs and a general checking of conditions must be made. Here are several things to look for: seepage through the walls, cracks in the walls, low spot in floor, exposed electric wiring, rotted support columns, and

RULES FOR FIRST CONTEST

Suggestions for improving any part of a house can be entered in the contest.

Cost of home improvement must be limited to $100, not including paint or labor.

Improvement must not call for professional services. All work must be within the scope of the average home workshop man.

Each entry must include a written description of 1,000 words or less, giving detailed instructions on carrying out the house improvement. Rough sketches to illustrate suggested changes should be included. Photographs are not required.

Modern Mechanix and Inventions reserves the right to publish any entry winning a prize without further compensation to contestant.

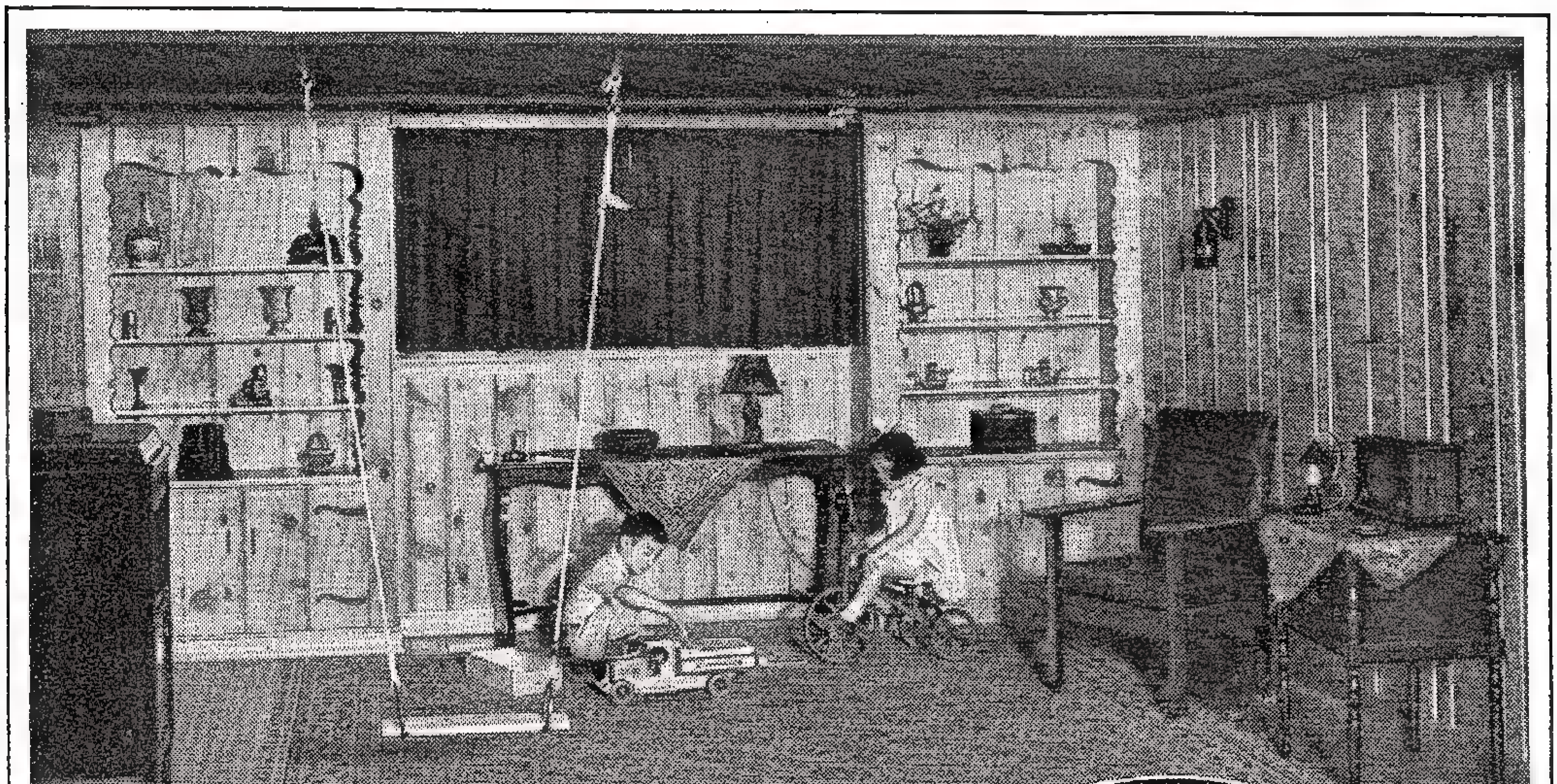
Each contestant agrees to permit Modern Mechanix and Inventions to publish all or part of any entry not winning a prize. Entries so used will be paid for at regular rates for amount of material published.

No entries will be returned. The most useful and practical entries submitted will be awarded 14 prizes: First prize $60.00; second prize $20.00; third prize $8.00; five fourth prizes at $5.00 each; six fifth prizes at $2.00 each; total $125.00.

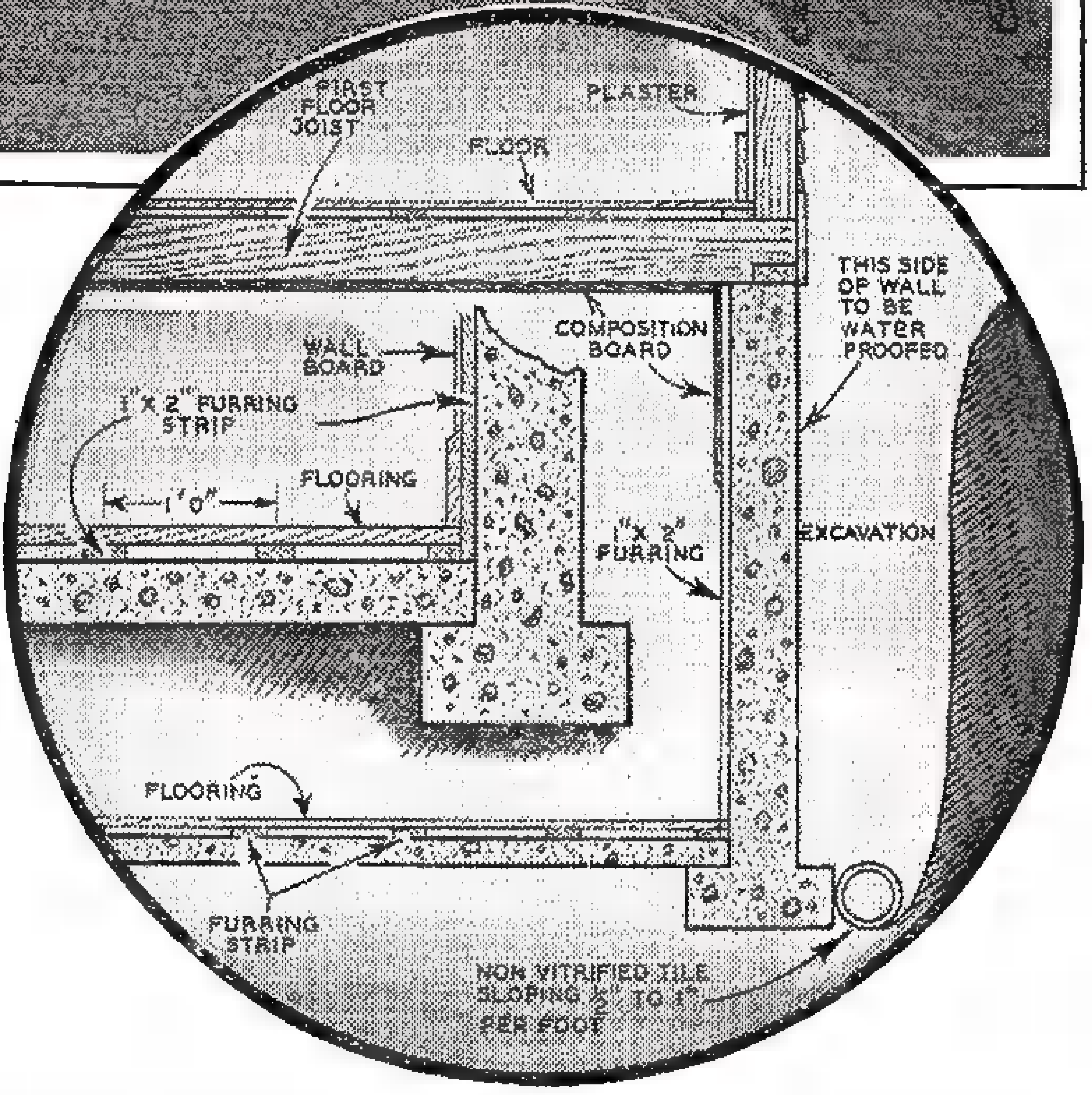
Address entries to Home Improvement Contest, Modern Mechanix and Inventions, 529 S. Seventh St., Minneapolis, Minn. All entries must reach this office before midnight, December 22, 1934. Winners will be announced in the March, 1935, issue of Modern Mechanix and Inventions. An entirely different contest offering another $125 in prizes will be announced in the January issue.

FOR NEXT CONTEST

Unfinished Pine Boards Used to Convert Basement Into Neat Playroom



Here is another method of using natural wood finish. Pine boards covered with clear varnish hide unsightly walls in this basement playroom. The simple cabinets are built in.



Waterproof basement walls on the outside by digging a trench around the house. Lay tile to improve drainage. A wood flooring can be installed as shown in above sketch.

loose steps in stairway. Here are some suggestions for correcting these defects.

Seepage through the walls indicates one or both of two things: that the walls are not waterproofed or that the grading outside, once properly finished off, now slopes toward, instead of away from, the basement wall. Cracks in the walls and floor show that there has been uneven settling—indicating insufficient packing of the soil when the house was built. The low spot in the floor which prevented water from entirely draining to the sewer lead shows haste or carelessness when the floor was laid.

If the steps are of wood and have begun to deteriorate, why not end this hazard for all time by putting in new ones of concrete? Wood forms for such steps are easily made by simply building a strong, well braced form with inside dimensions the same size as the complete stairway. The top of each step is left open for smoothing the concrete. The entire stairway requires just one mold into which the concrete is poured.

If more light is needed in the basement, the window openings can be enlarged and new sash put in without affecting the stability of the house. And if the home is of the older type, snuggled close to the ground, you can cut openings for the sash, insert sash frames, then build a concrete airway around each as shown in one of the sketches. Each airway should be concrete at the bottom, the corners reinforced with stiff wire, and a drain placed in each under

(Continued on page 139)

IMPROVE, REBUILD, OR REPAIR YOUR HOME WITH GOVERNMENT AID

Under the National Housing Act, the Federal Housing Administration has provided means of loaning funds to home owners.

Loans of $100 to $2000 can be obtained from any bank, building and loan association, or finance company approved by the Federal Housing Administration. Loans are for one to three years payable in monthly installments at not more than 5% interest a year.

Assurance required: You must be the property owner; have an annual income five times annual payment of note; mortgages in good standing; and no past due taxes.

Signature of home owner only required.

Get further information and interesting booklets from the Federal Housing Administration, Washington, D. C.

Lights Create Sun Effect in Home

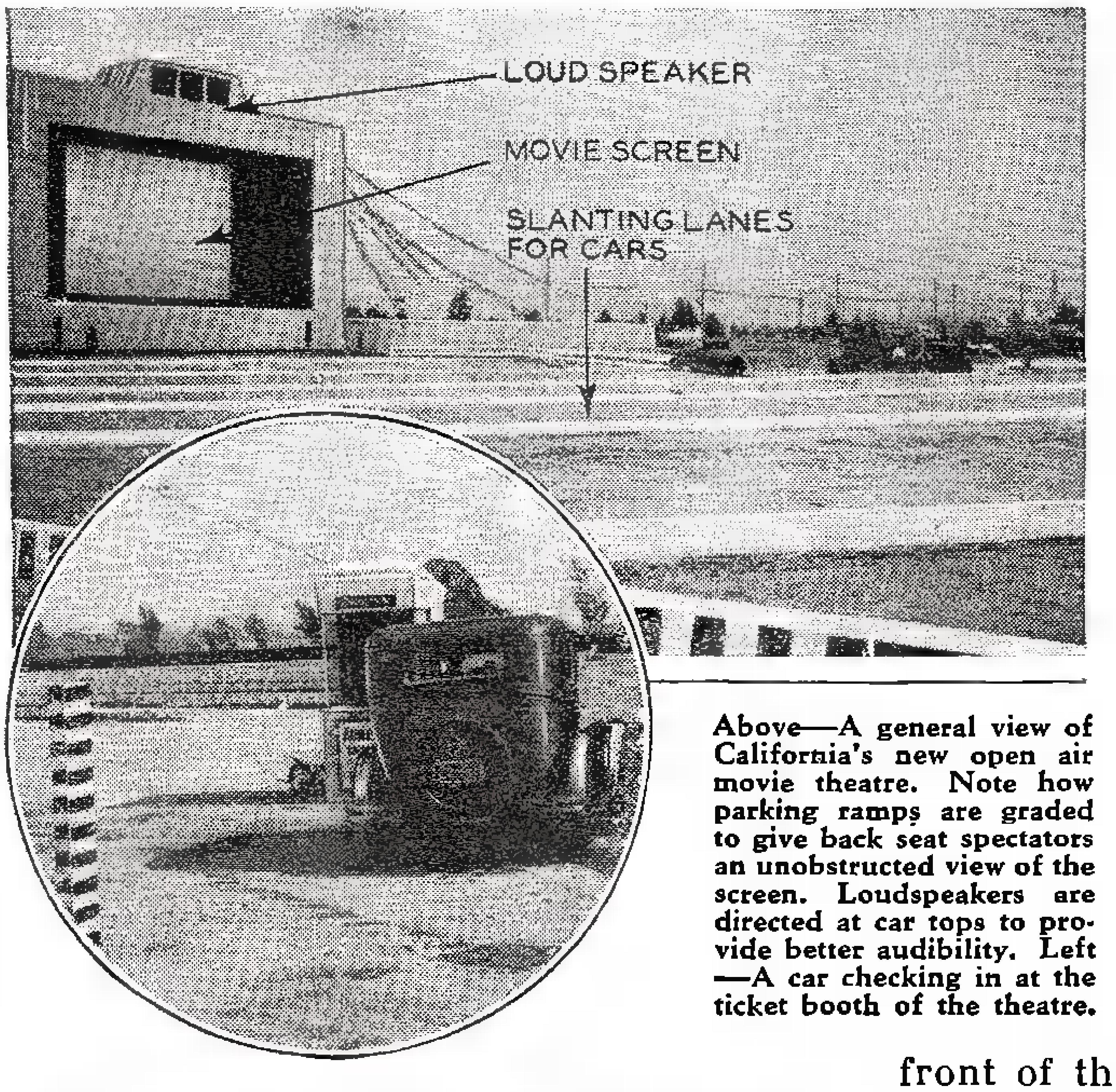
MOIST AIR is supplied by a jug-humidifier with a 3½ gallon capacity which plugs into any electric socket.

SUNLIGHT produced by flat fixtures in sides of window dispels night's darkness to create the cheerful illusion of sunlight falling on pane and curtains.

JAR CAP—Rubber cap fits into jar and is then held securely in place with a tension spring.

STRAINER—This bakelite strainer fits snugly on any teapot, including those which have broken spouts.

California Autoists View Movies in New Open Air Theatre



Above—A general view of California's new open air movie theatre. Note how parking ramps are graded to give back seat spectators an unobstructed view of the screen. Loudspeakers are directed at car tops to provide better audibility. Left—A car checking in at the ticket booth of the theatre.

LOS ANGELES motorists, movie bound, may now sit in their cars and enjoy the latest sound pictures in a giant open air theatre recently completed.

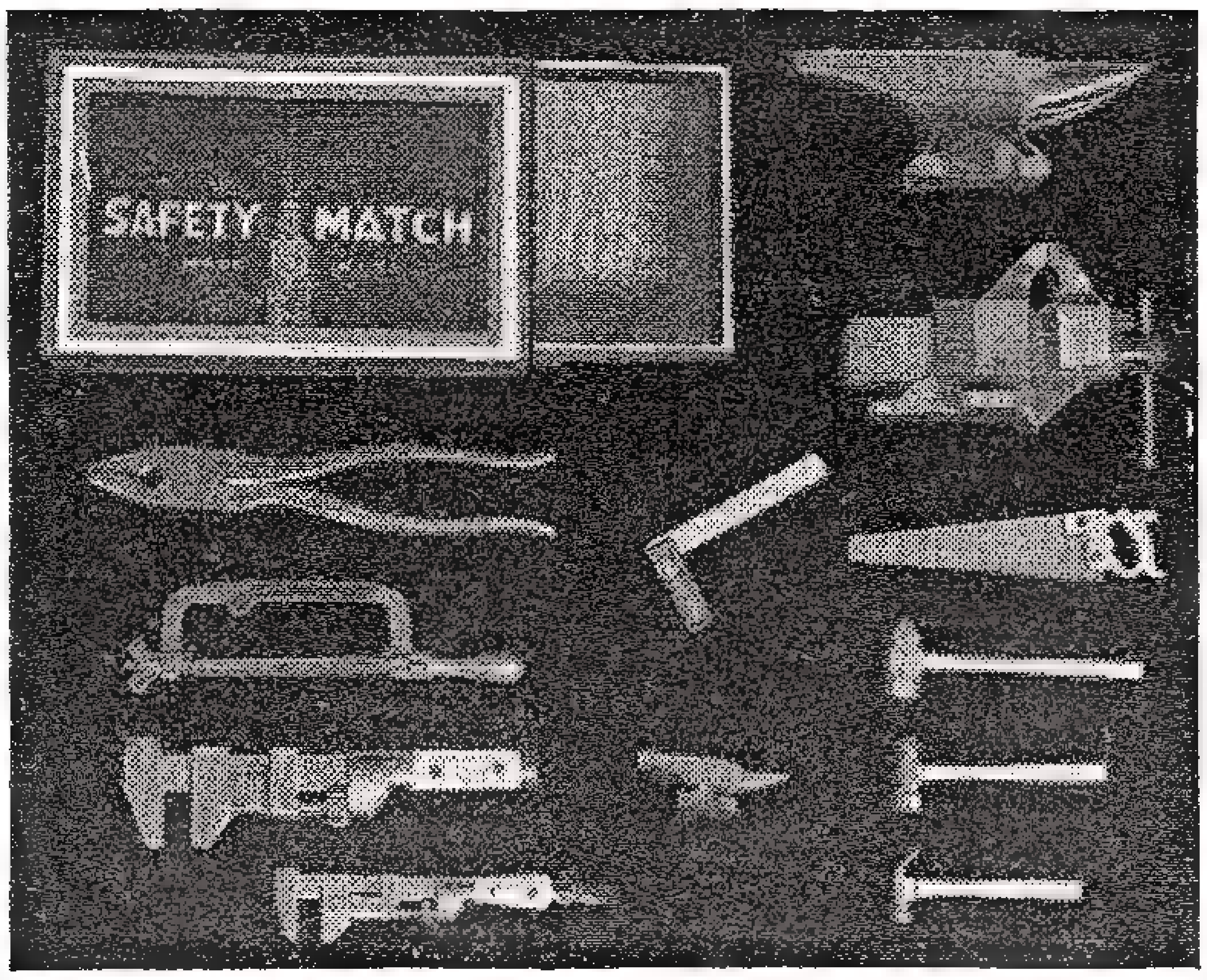
The frame which holds the 40 by 50 foot screen is a structure 72 feet high and 132 feet wide. Three huge loudspeakers, each 22 feet long and 7 feet across the mouth, are mounted on top of the structure. These loudspeakers are directed at the tops of the cars, whose soft fabric is said to make an ideal sounding board.

The fenced-in spectators' area holds 450 cars which are parked in lanes graded at an angle so that the cars point up at the screen. This inclination enables back-seat spectators to obtain a unobstructed view of the screen. Projection machines are in a low building in front of the screen, said to be the largest in the world. Installed in a low building in the second row, these machines work at an up-shot angle, instead of the customary down-shot used in indoor theatres.

Midget Tool Kit Fits Matchbox

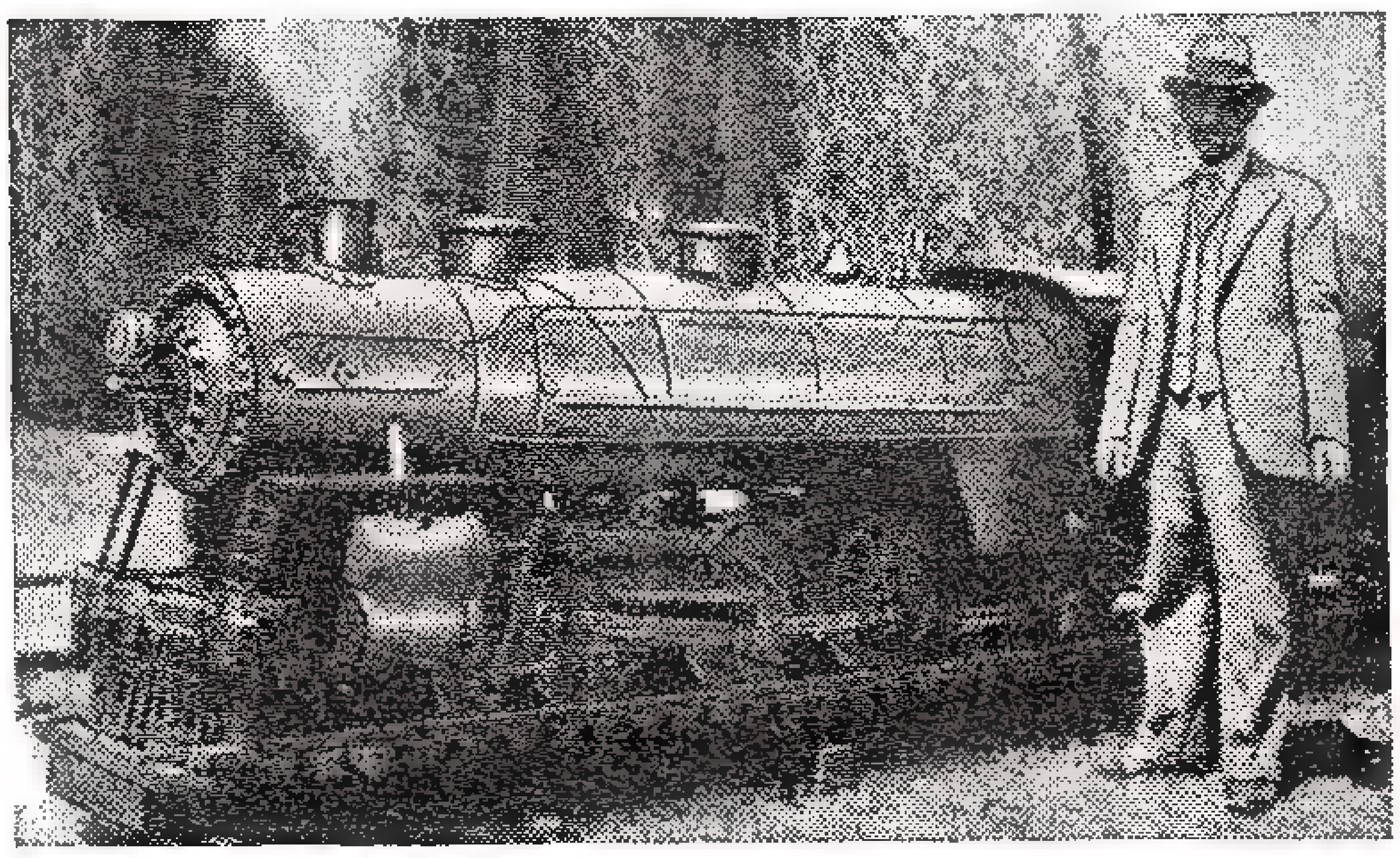
A MINIATURE tool kit, small enough to fit easily into an ordinary safety match box, has recently been completed by a Minneapolis craftsman. The hammers, hack saw frame, pliers and square were made from nails. Handles for the hammers and the hand saw were tooled out of artificial ivory secured from an old comb. The tiny wrenches are fitted with handles made from pearl buttons. Small files, a hack saw, tap and die and several small drills were used to build the tiny tool kit.

Each of the miniature tools is a working model of its full-sized counterpart. Several weeks were required to construct the set.



Combs, nails and pearl buttons furnished the materials for this tool kit, which fits into an ordinary matchbox.

Students Build Model Locomotive

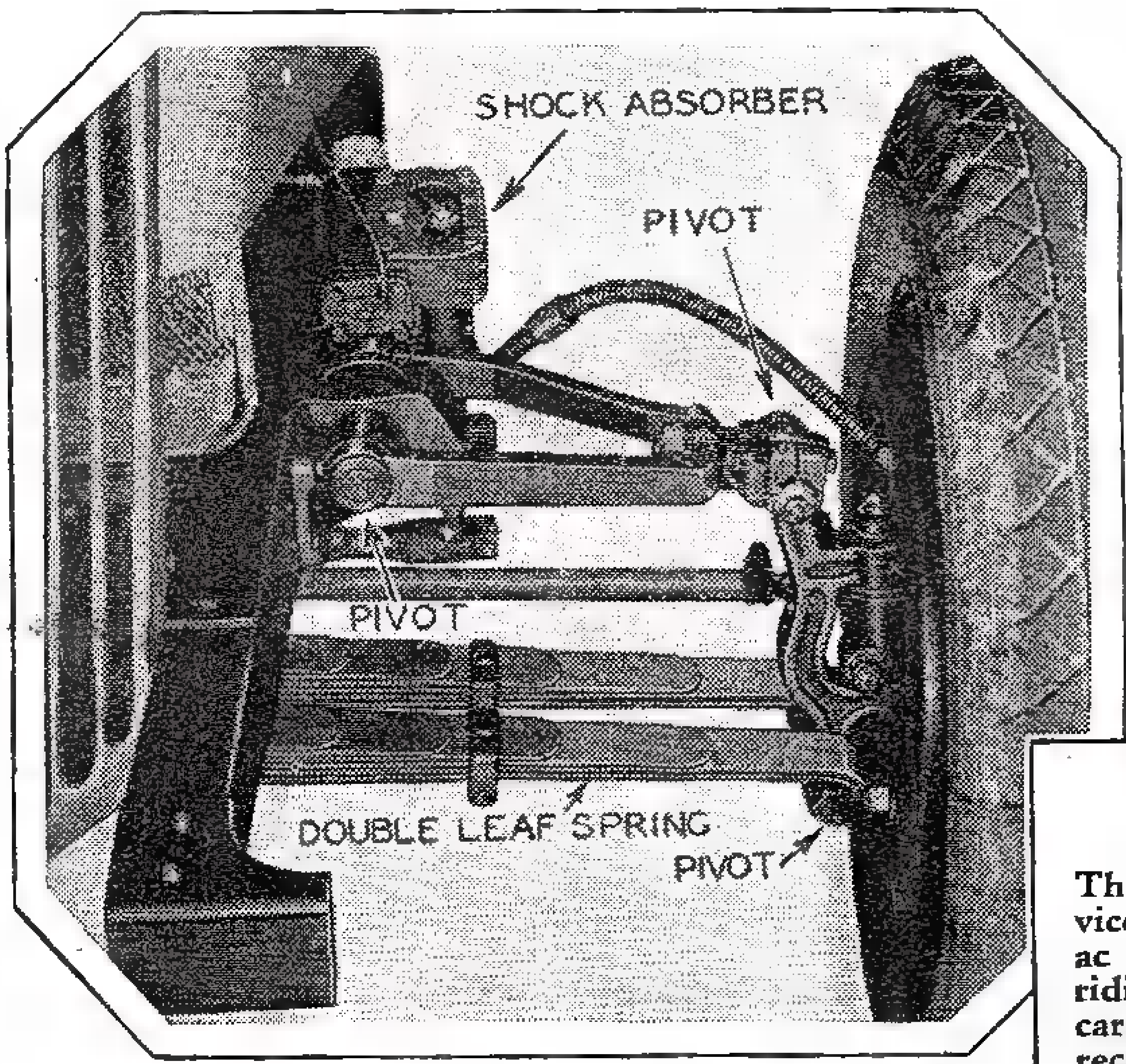


Built by North Dakota engineering students, this model locomotive develops 11.5 horsepower at 15 miles per hour.

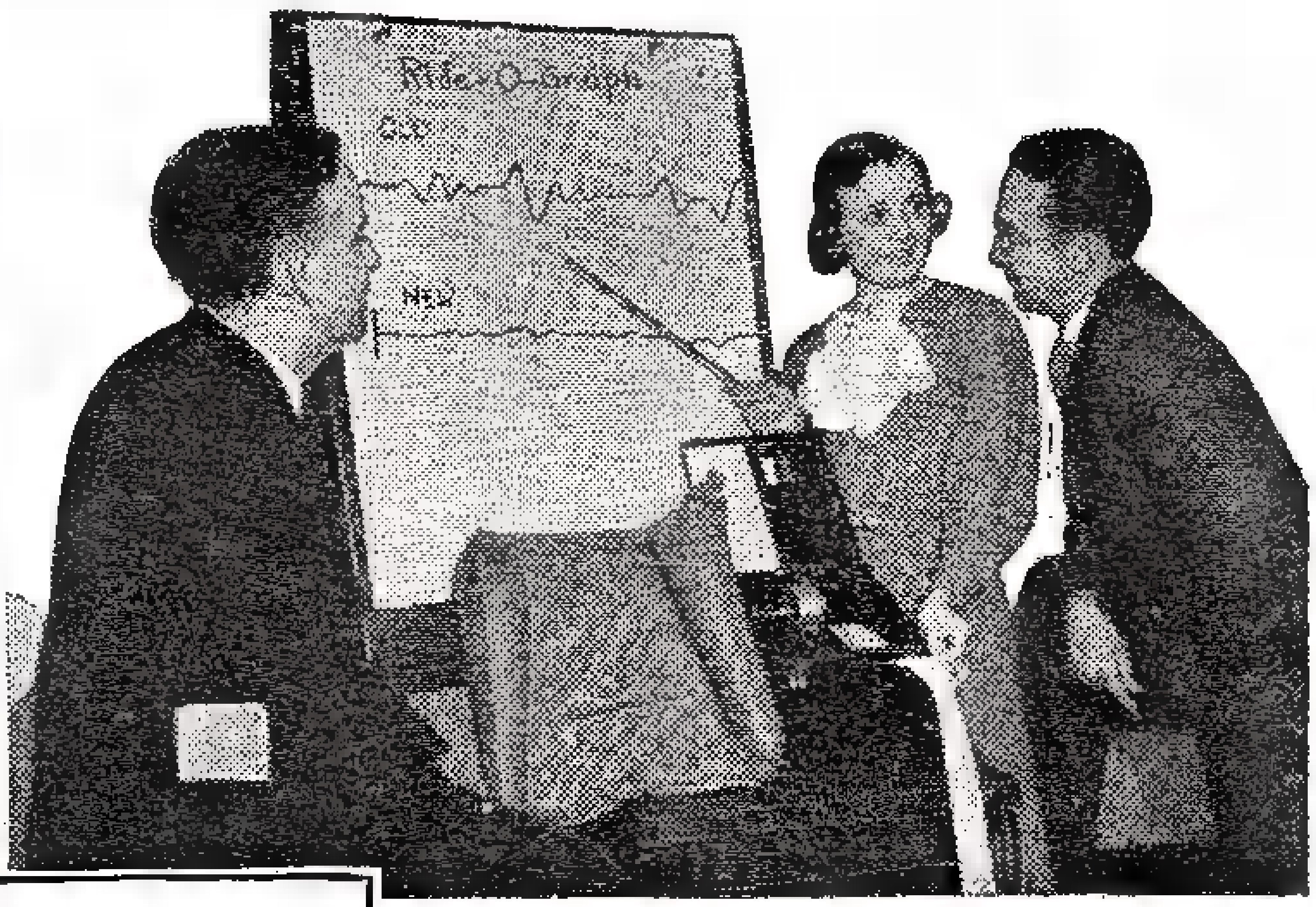
UNDER the direction of Professor A. W. Preston, mechanical engineering students of the University of North Dakota have built a 3,000 pound working model of a railroad locomotive.

Built to a 1/5 scale, according to Professor Preston's plans, the finished model is 38½ inches high and 16 feet, 5 inches long. The boiler has 76 one inch tubes with a total heating surface of 11.8 square feet. The sturdy model has a drawbar pull of 334 pounds and develops 11.5 horsepower at a speed of 15 miles per hour.

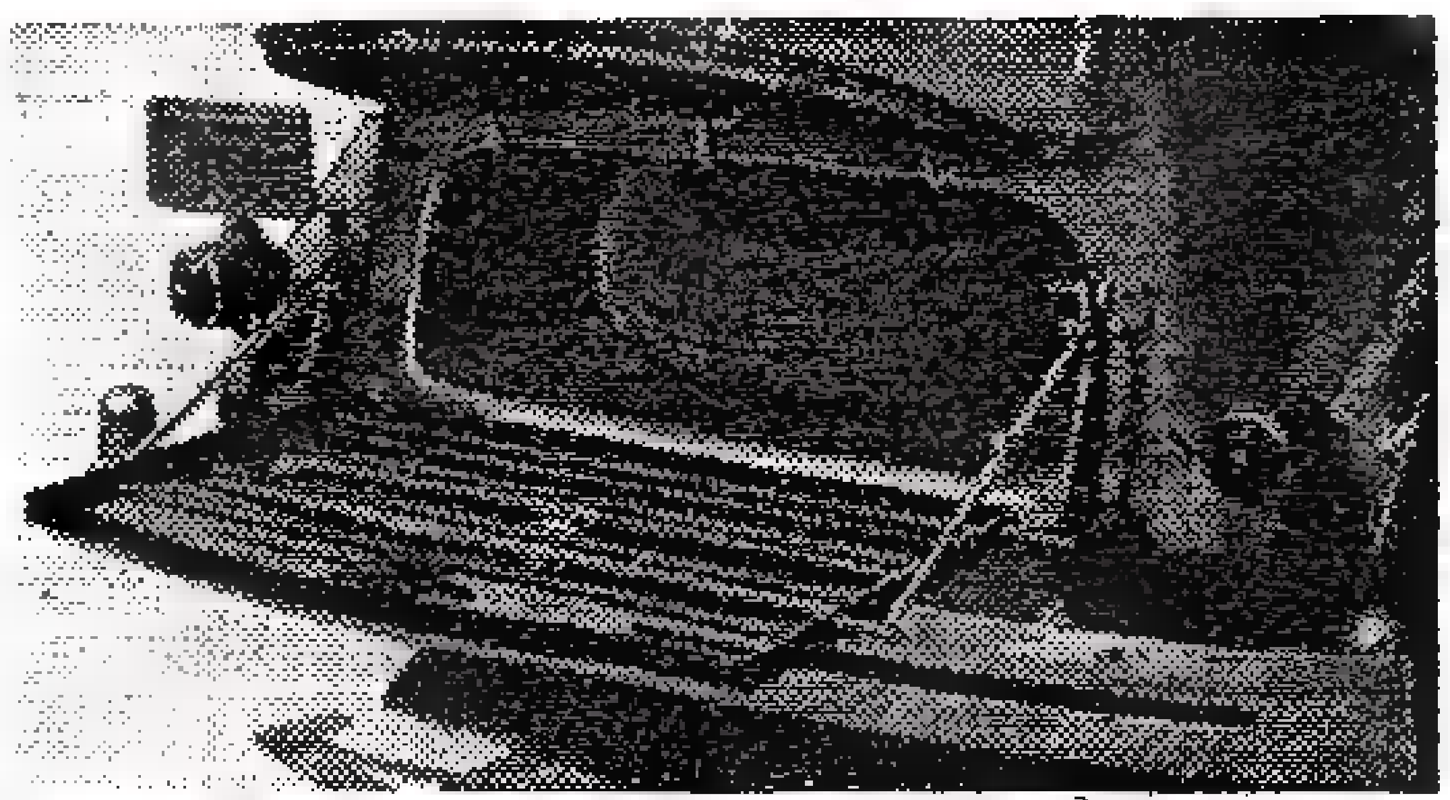
INVALID *Car Features New 1935 Autos*

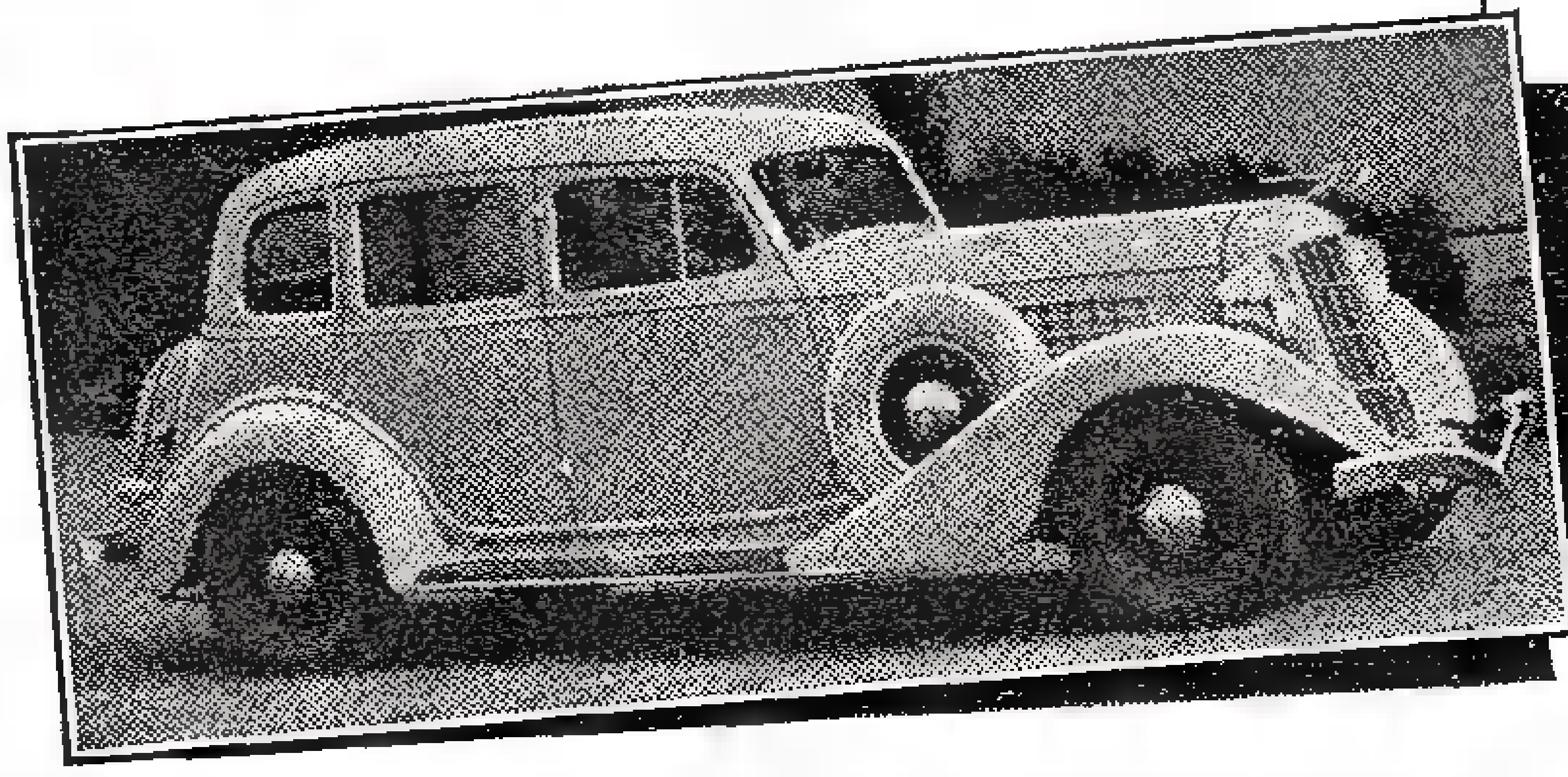


New independent wheel suspension uses transverse springs instead of coil springs of "knee action" cars.

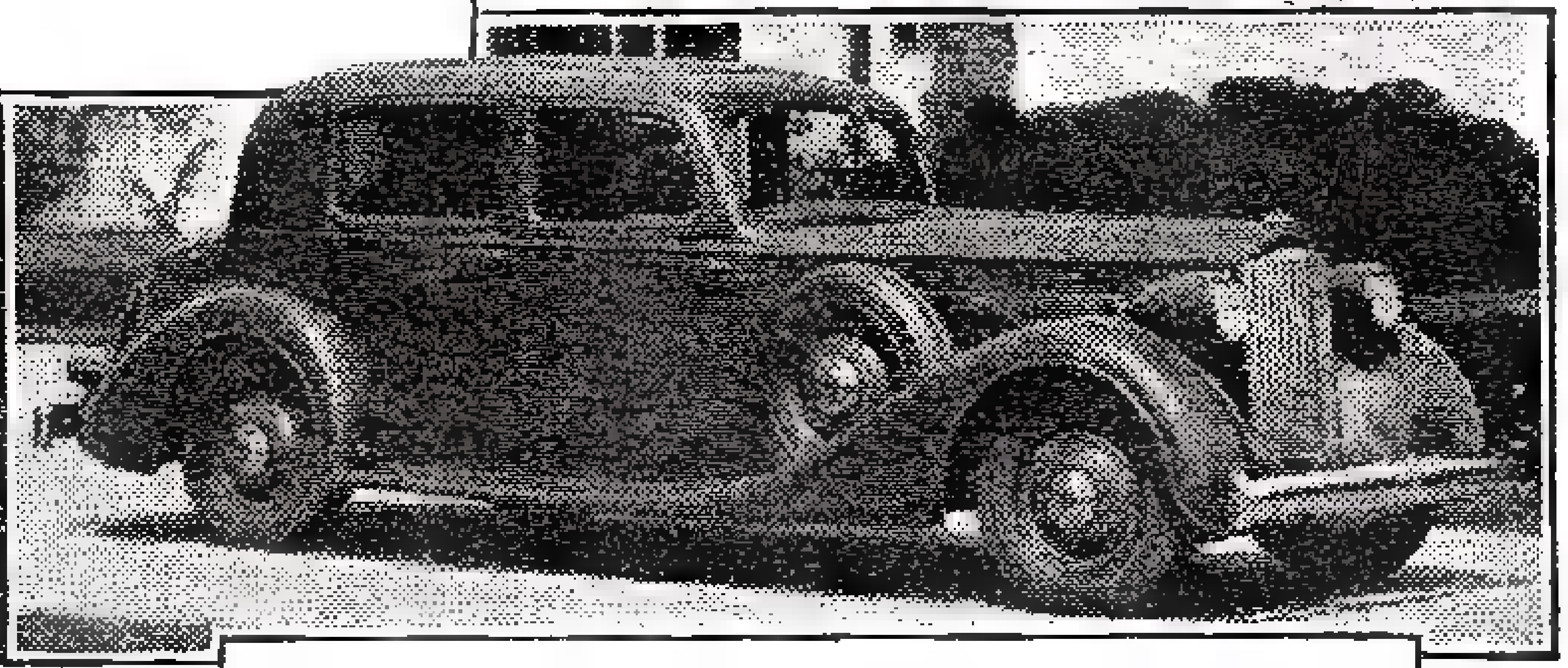


This testing device shows Pontiac prospects the riding qualities of cars. Air cushion records bumps on graph as shown.

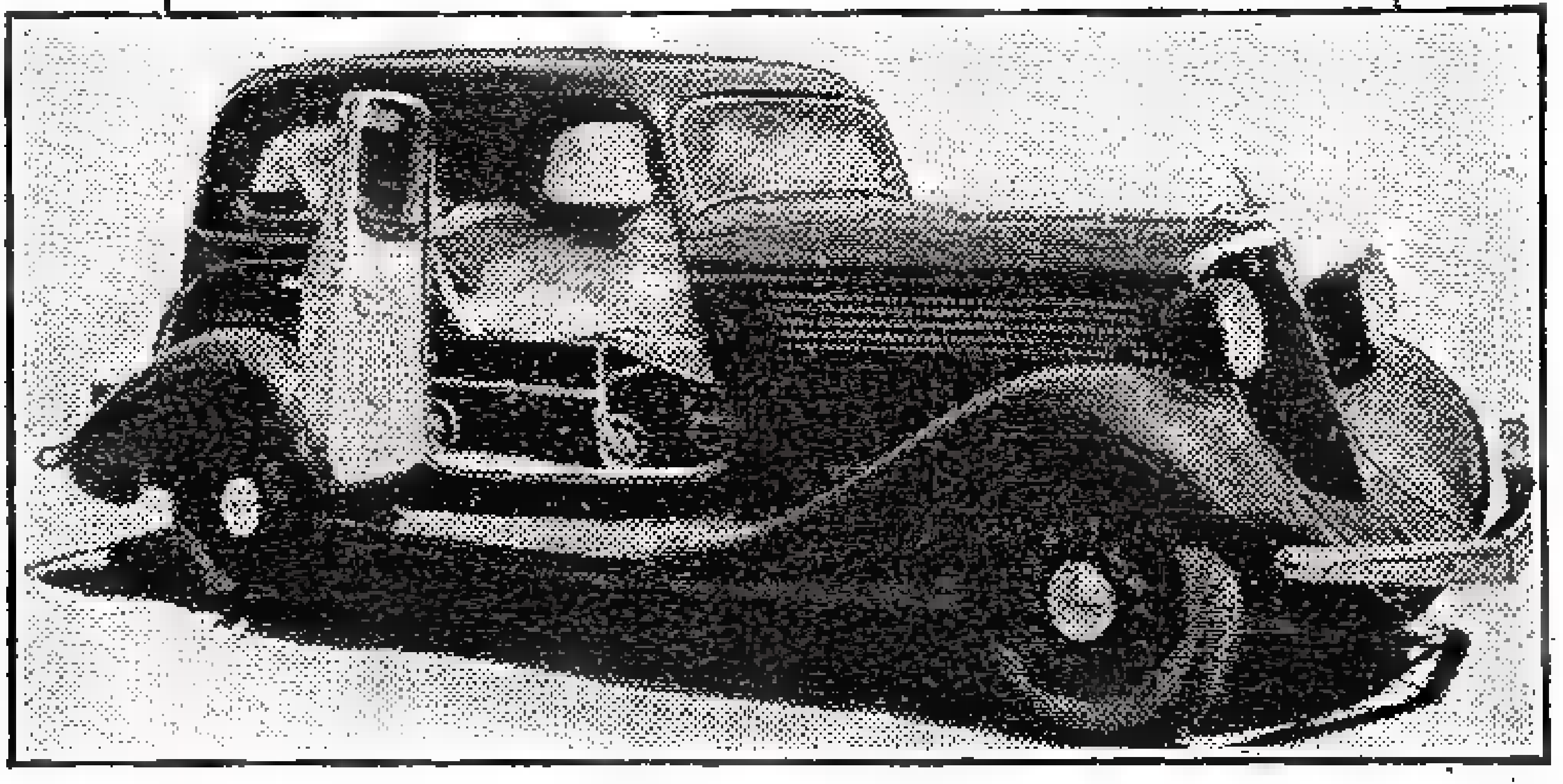




Improved flowing lines are noted in above 1935 Auburn. A governor holds speed to 35 m. p. h. while breaking in.



This 1935 Packard shows more streamlining. Top photo shows spare tire compartment underneath the luggage trunk.



Ambulance cot is shown in place in this invalid car introduced by Studebaker. It is convertible to passenger car.

PASSENGER automobiles easily and quickly converted for carrying invalids, feature the advanced showing of 1935 models of automobile manufacturers. The new cars show greater streamlining, use of reserve space for stowage, improved riding qualities, and governors to hold down speed during the "breaking in" period.

Studebaker has made its brougham body convertible into an ambulance, designed for country and small town doctors who frequently must convey patients to hospitals in nearby cities. The right front seat of this passenger car can be removed in thirty seconds and the chair-cot put in its place.

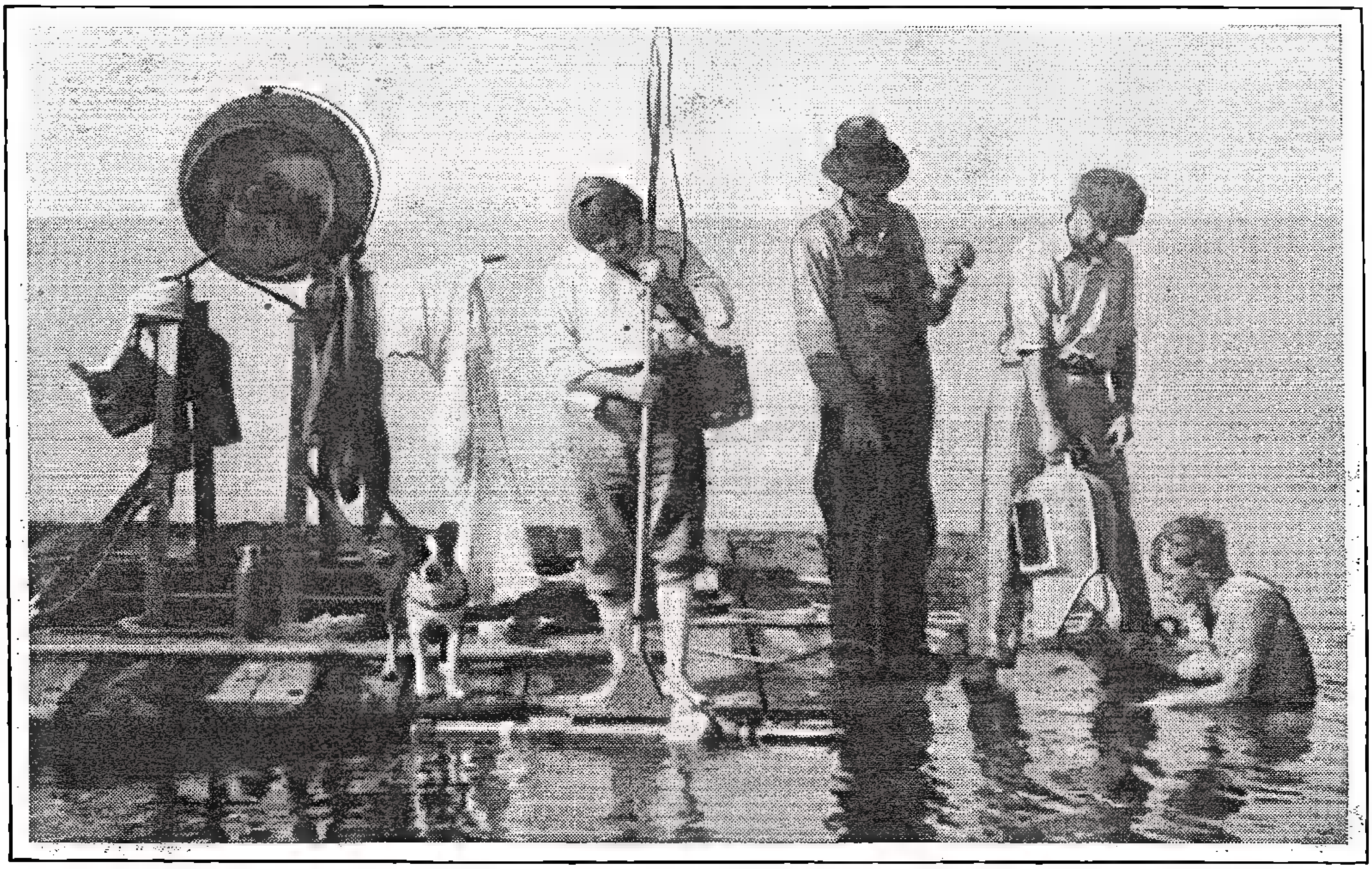
Auburn has inaugurated the use of governors on its 1935 models to hold speed below 35 miles an hour during the "breaking in" period. The device was installed to prevent ruining the motor with excessive speed.

Packard also has gone in for more streamlining without discarding the hood lines which have identified it for 30 years. The new cars include new bearings, claimed to be a most important engine development. The old babbitt type are replaced with better wearing metal.

As an aid to selling its cars, Pontiac is displaying the "ride-o-graph." The prospective customer rides in the car with his back against a pneumatic cushion that is connected to a stylus which records every irregularity of the road.

A new, independent wheel suspension has been introduced using the ordinary transverse spring instead of the coil spring now employed on "knee action" models. No announcement has yet been made as to the manufacturer that may use the method.

Radio Diviner Helps Diver to Locate Sunken War Relics



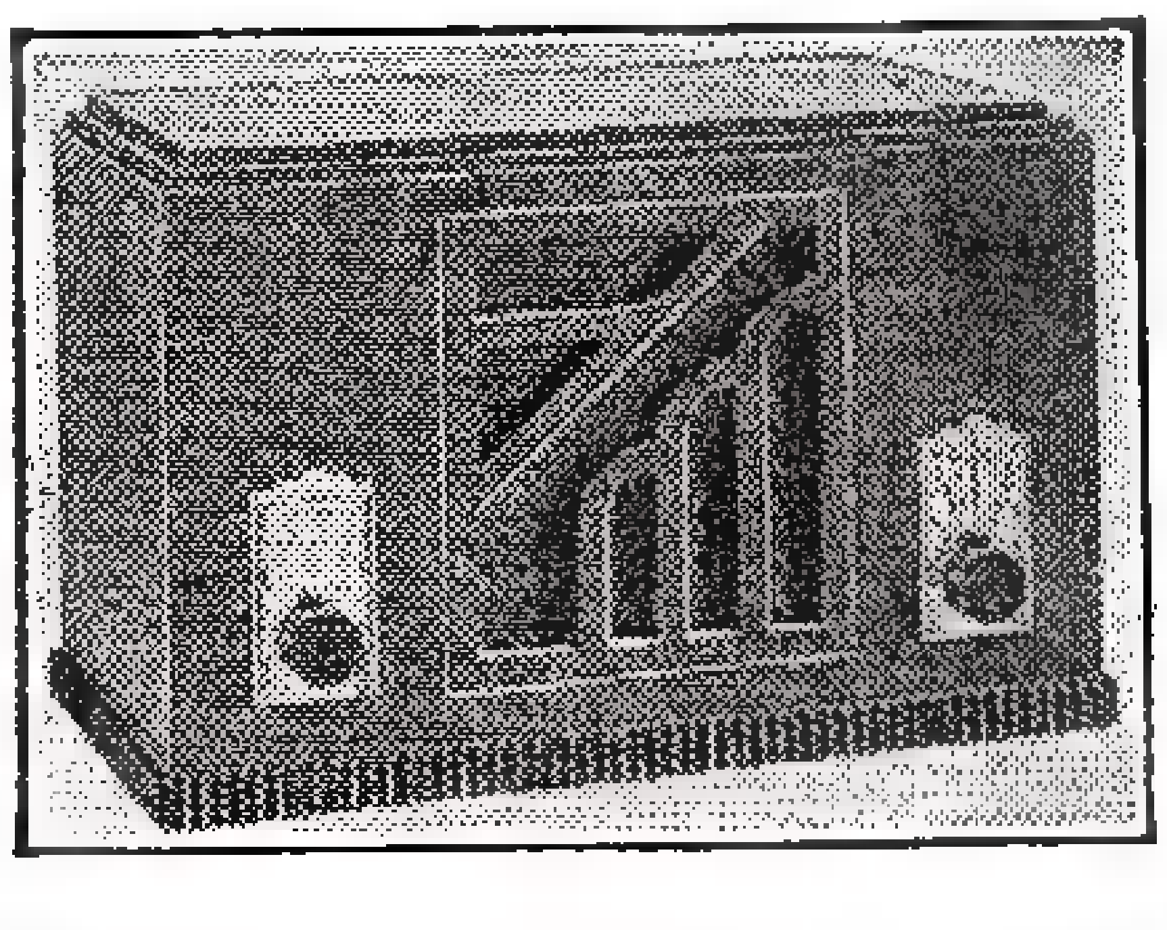
Raft equipped with radio divining rod apparatus and air pumps, is used on Lake Ontario to locate old cannon and other relics of early warfare, to be used in re-equipping Fort Niagara. Pump man is holding cannon ball brought up by diver.

CANNON balls, guns, and other war-time relics needed to re-equip old Fort Niagara are being located by electric divining rod equipment and brought up from the bottom of Lake Ontario by divers. These antiques were used in naval battles just a short distance out from this famous fort during the War of 1812.

Radio signals sent out by a coil of wire dragged along the lake bottom produce an indication on the recording meter aboard the raft whenever a metallic body is passed.

Home-made diving helmets supplied with air by pumps but little larger than those used for auto tires, are satisfactory for this work, since the water is seldom more than 20 feet deep.

Rural Radio Needs No B Batteries



Midget radio in attractive cabinet operates from 6-volt storage battery. Drain on the battery is two amperes, one-fifth that of the usual headlight drain on car.

LOW cost radio reception in homes not having electricity is now possible with a midget four tube receiver operating directly from a 6-volt storage battery. A vibrator type power unit delivers 200 volts.

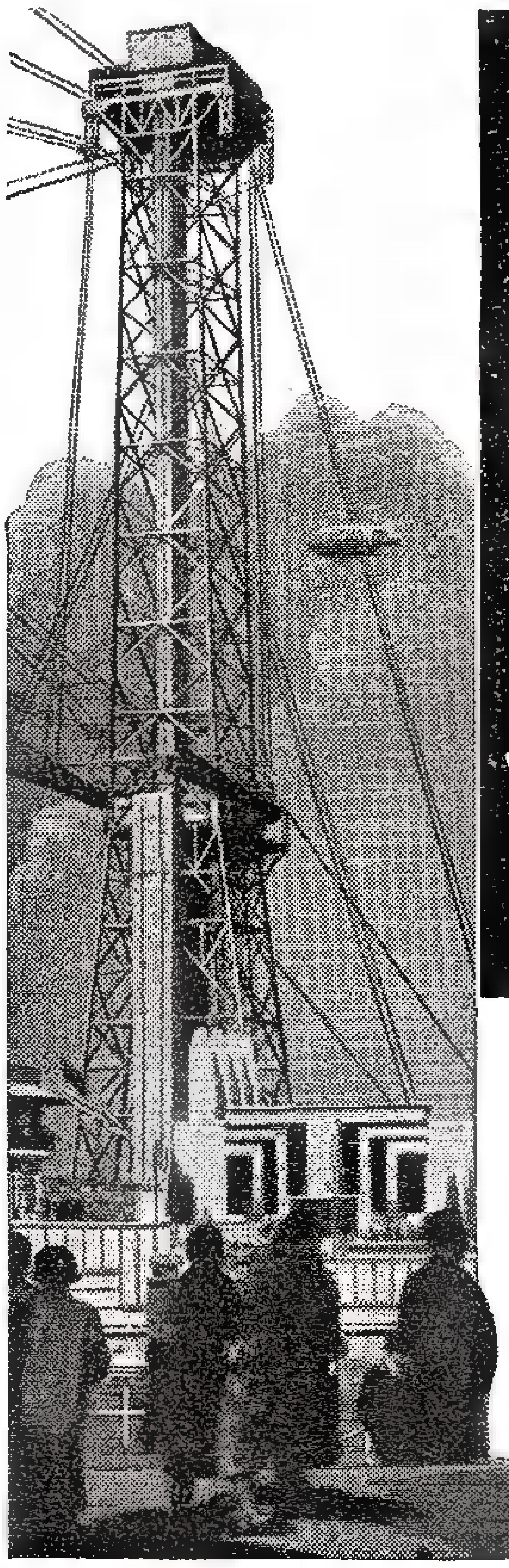
Portable X-ray Machine Is Speedy

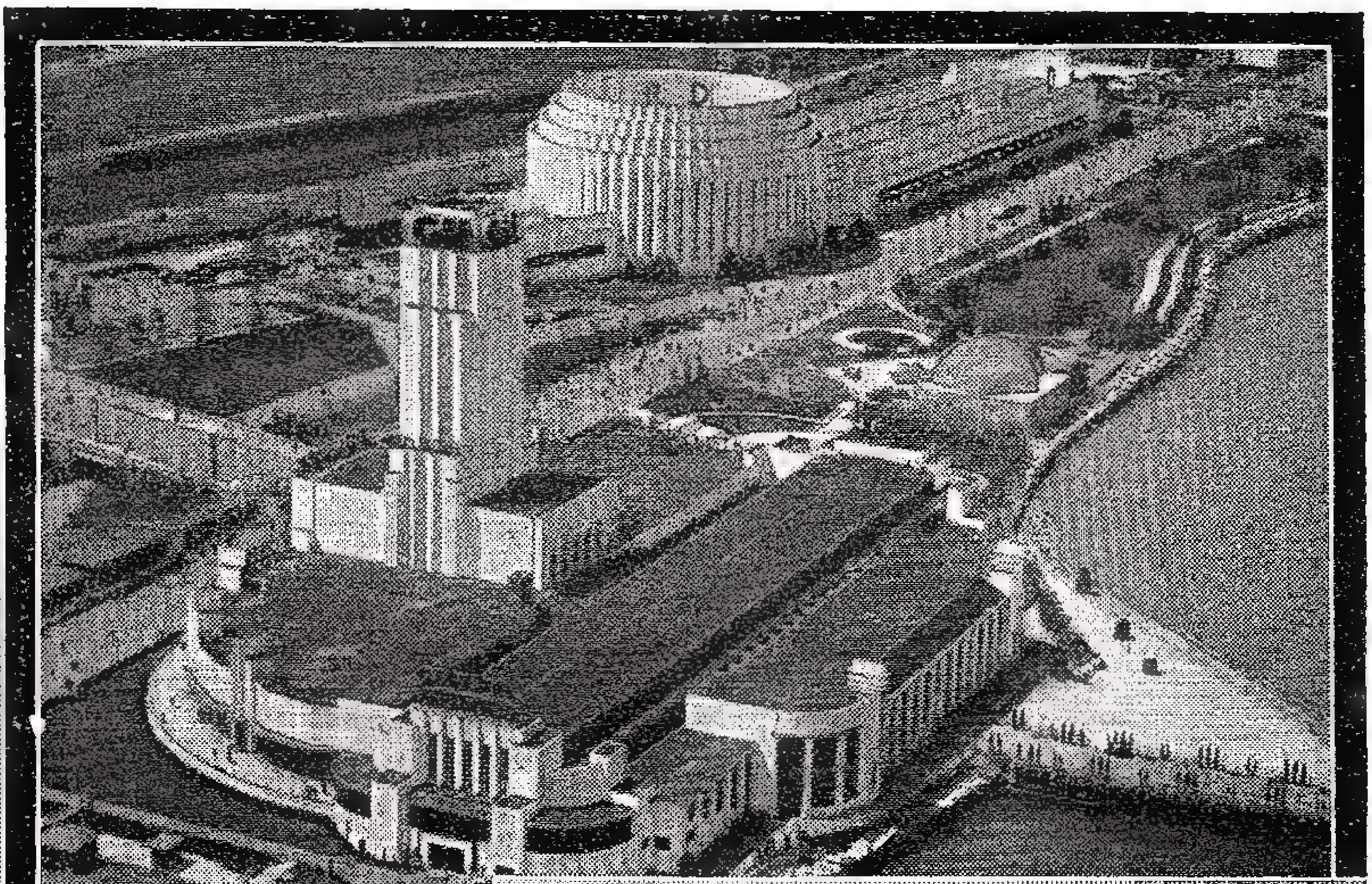
ALMOST as fast as 100 Pasadena boys and girls could file in and out of a booth, their chests were X-rayed by what is believed to be the fastest portable X-ray machine in the country. The entire group was photographed in forty minutes.

California state health officials, believing hundreds of school children can be saved from tuberculosis by early diagnosis, plan to give every school pupil an X-ray examination by this method.

Portable X-ray machine being used by California state health officials to take chest X-rays of school children. As many as 150 children can be examined for tuberculosis in one hour.

Wrecking Chicago's Century of Progress





Above—An aerial view of the General Motors and Ford buildings which may be retained as a permanent industrial exhibit. Left—One of the sky ride towers, which is expected to remain as an observation tower and dirigible mast.

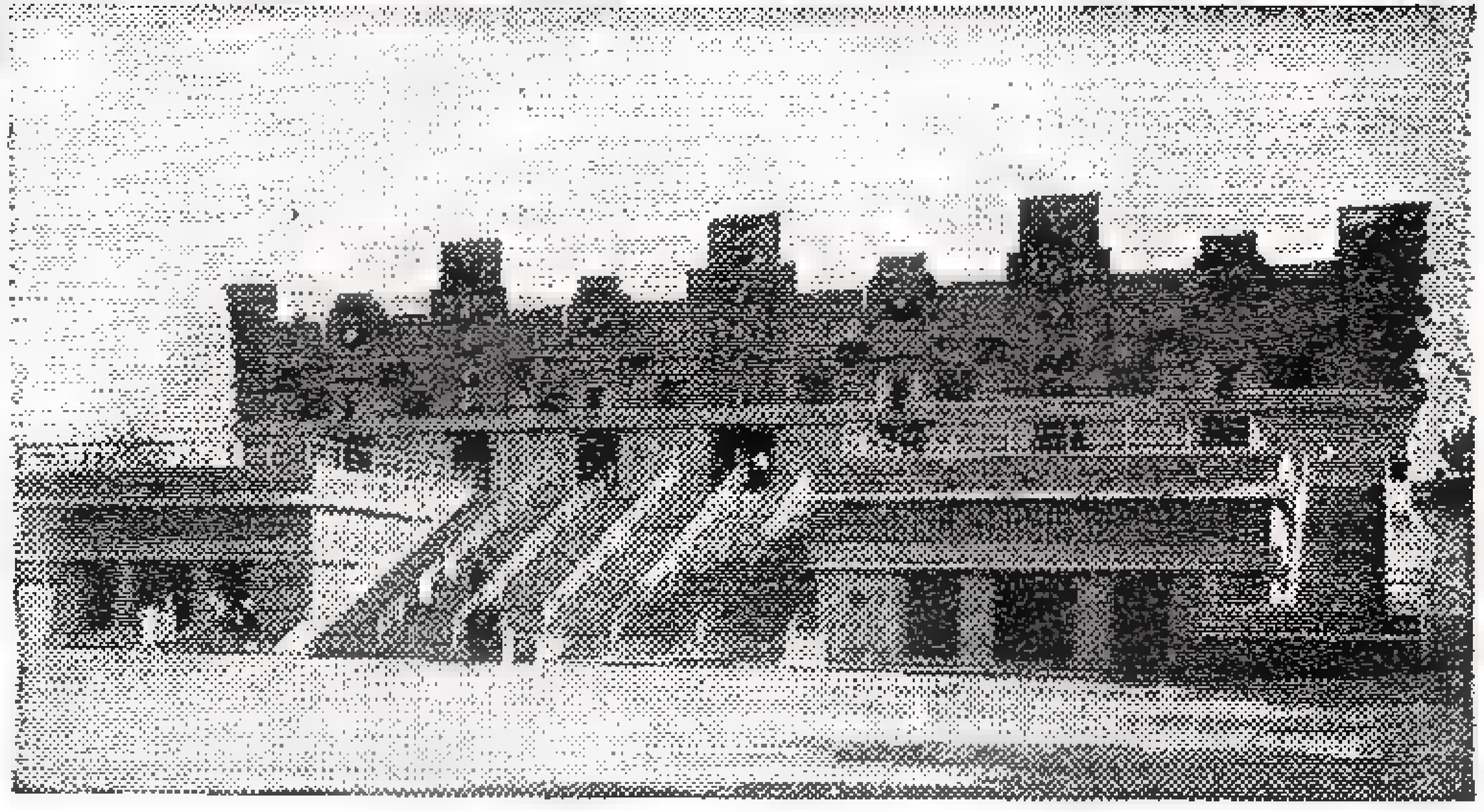


Photo shows the Mayan Temple which will, in all probability, escape the wreckers' hammers. Present plans are to use the elaborate structure as a park board rest house.

WITH the official closing of Chicago's Century of Progress the greatest world's fair in history—a $44,000,000 exposition—becomes just another salvage job for the junk men and the wrecking crews.

The mammoth exposition is not expected to be razed in its entirety, but just which of the buildings will remain is still a matter of conjecture. Tentatively, however, these structures are expected to be retained:

The Administration Building, which housed the Fair's executive offices, is scheduled to be the executive offices of the Chicago Consolidated Park Board.

One tower of the sky ride will serve as a sight-seeing tower and a possible mooring mast for dirigibles.

The Sears-Roebuck building and the Mayan Temple, proposed as rest houses for the big, lake-front park.

One wing of the Hall of Science, to be retained as a convention assembly hall.

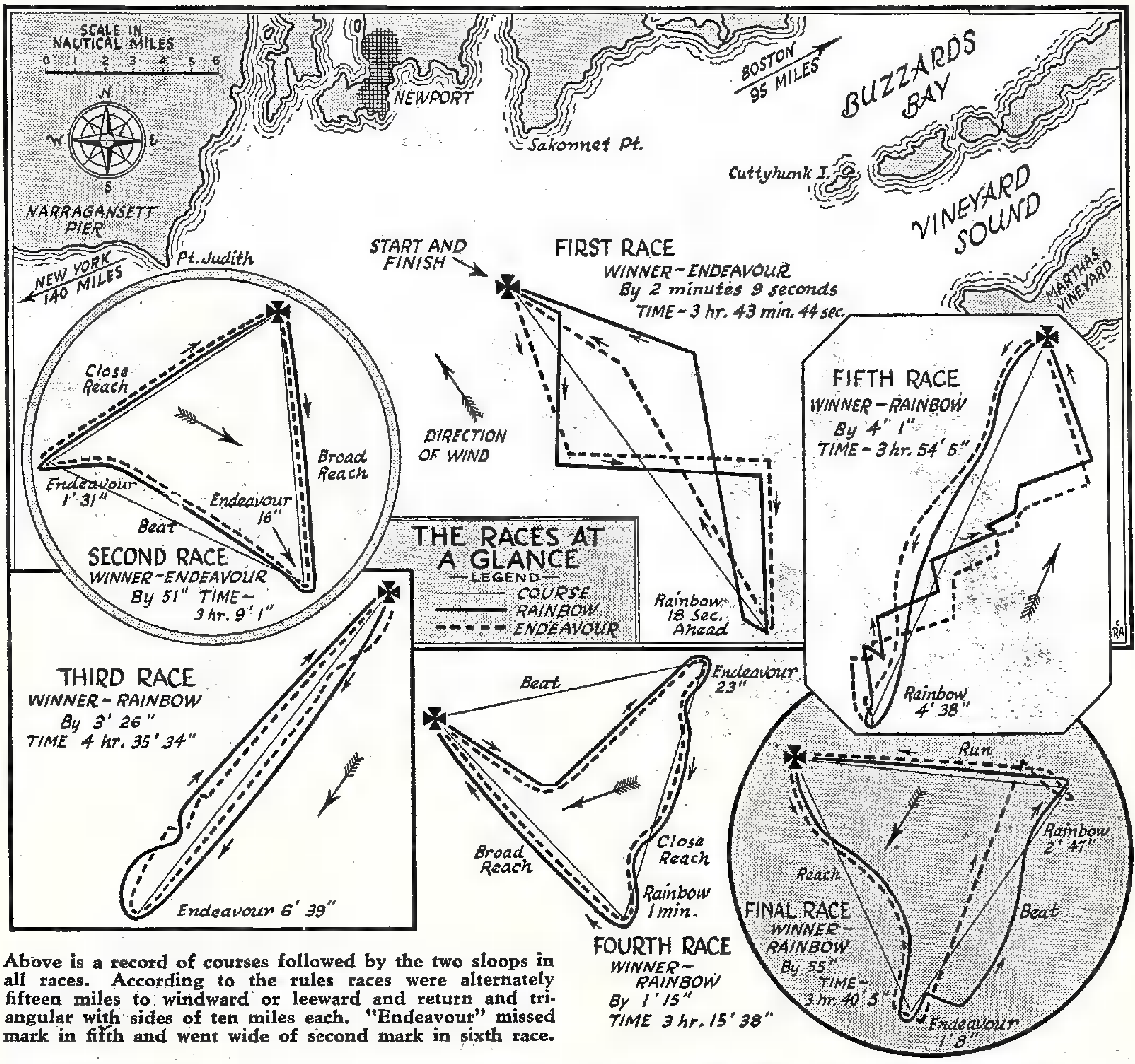
The Ford, General Motors, Chrysler and Firestone buildings may remain as a permanent industrial exhibit. The Ford building, for example, was not built for the first year of the Fair, but the second; and into it went lasting materials good for ten years or more. The Firestone building is likewise built for permanency. Erected as a temporary structure for the first year of the Fair, it was reconditioned before the 1934 opening and may be used for years if necessary.

Other buildings typical of the exposition, however, such as the $500,000 Travel and Transport Building and the $700,000 Electrical Building, will be scrapped.

Few, if any, of the numerous villages are expected to remain. Representing a construction cost of more than $3,000,000, these structures will net the salvage men little more than the cost of the wrecking operations. The sturdy "stone" walls of the Belgian village, for instance, are merely plyboard, three-eighths to one-half an inch thick, nailed on two-by-four scantlings.

Fostered by carnival men, a movement is under way to persuade the Chicago Park Board to retain the rides and concessions on Northerly island as a permanent amusement park. This move is contingent on politics since the island is park property and special legislation is needed to grant their request.

WHY SPEED LOST IN


SCALE IN NAUTICAL MILES
0 1 2 3 4 5 6
N
W
E
S
NARRAGANSETT PIER
NEW YORK 140 MILES
Pt. Judith
NEWPORT
Sakonnet Pt.
BOSTON 95 MILES
BUZZARDS BAY
Cuttyhunk I.
VINEYARD SOUND
MARTHAS VINEYARD
START AND FINISH
FIRST RACE
WINNER – ENDEAVOUR
By 2 minutes 9 seconds
TIME – 3 hr. 43 min. 44 sec.
DIRECTION OF WIND
Rainbow 18 Sec. Ahead
Close Reach
Broad Reach
Endeavour 1' 31"
Endeavour 16"
Beat
SECOND RACE
WINNER – ENDEAVOUR
By 51" TIME – 3 hr. 9' 1"
THE RACES AT A GLANCE
—LEGEND—
COURSE
RAINBOW
ENDEAVOUR
FIFTH RACE
WINNER – RAINBOW
By 4' 1"
TIME – 3 hr. 54' 5"
Rainbow 4' 38"
THIRD RACE
WINNER – RAINBOW
By 3' 26"
TIME 4 hr. 35' 34"
Endeavour 6' 39"
Beat
Endeavour 23"
Broad Reach
Close Reach
Rainbow 1 min.
FOURTH RACE
WINNER – RAINBOW
By 1' 15"
TIME 3 hr. 15' 38"
Run
Rainbow 2' 47"
Reach
Beat
FINAL RACE
WINNER – RAINBOW
By 55"
TIME – 3 hr. 40' 5"
Endeavour 1' 8"

Above is a record of courses followed by the two sloops in all races. According to the rules races were alternately fifteen miles to windward or leeward and return and triangular with sides of ten miles each. "Endeavour" missed mark in fifth and went wide of second mark in sixth race.

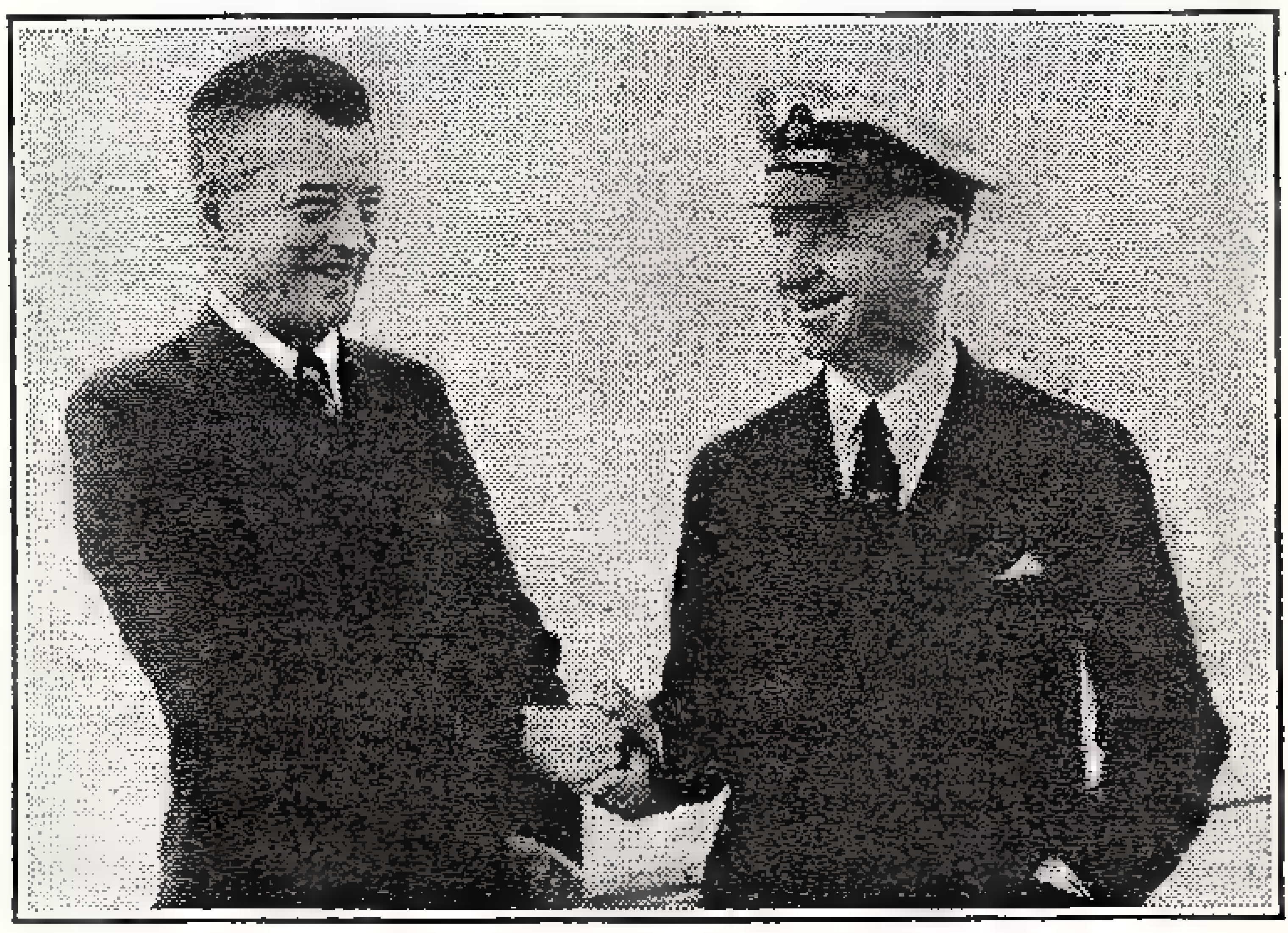
SPEED lost in the America's Cup Races. The sixteenth international sailing classic witnessed the paradox of an apparently faster ship going down to defeat.

Rainbow's victory upheld America's sailing supremacy. The British, on the other hand, have only the consolation of knowing that for the first time in 84 years they had an opportunity to bring the "old mug" back to England.

The simple statement that America won when *Rainbow* defeated the British *Endeavour* four out of six races hardly tells the story. Most experts agreed that the British sloop was faster than *Rainbow,* yet *Endeavour* was decisively beaten.

Why? Mainly because the comparatively inexperienced amateur British crew bungled so badly in handling ship and sails. The professional American crew made no mistakes. Then, too, experts concede that the British skipper, T. O. M. Sopwith,

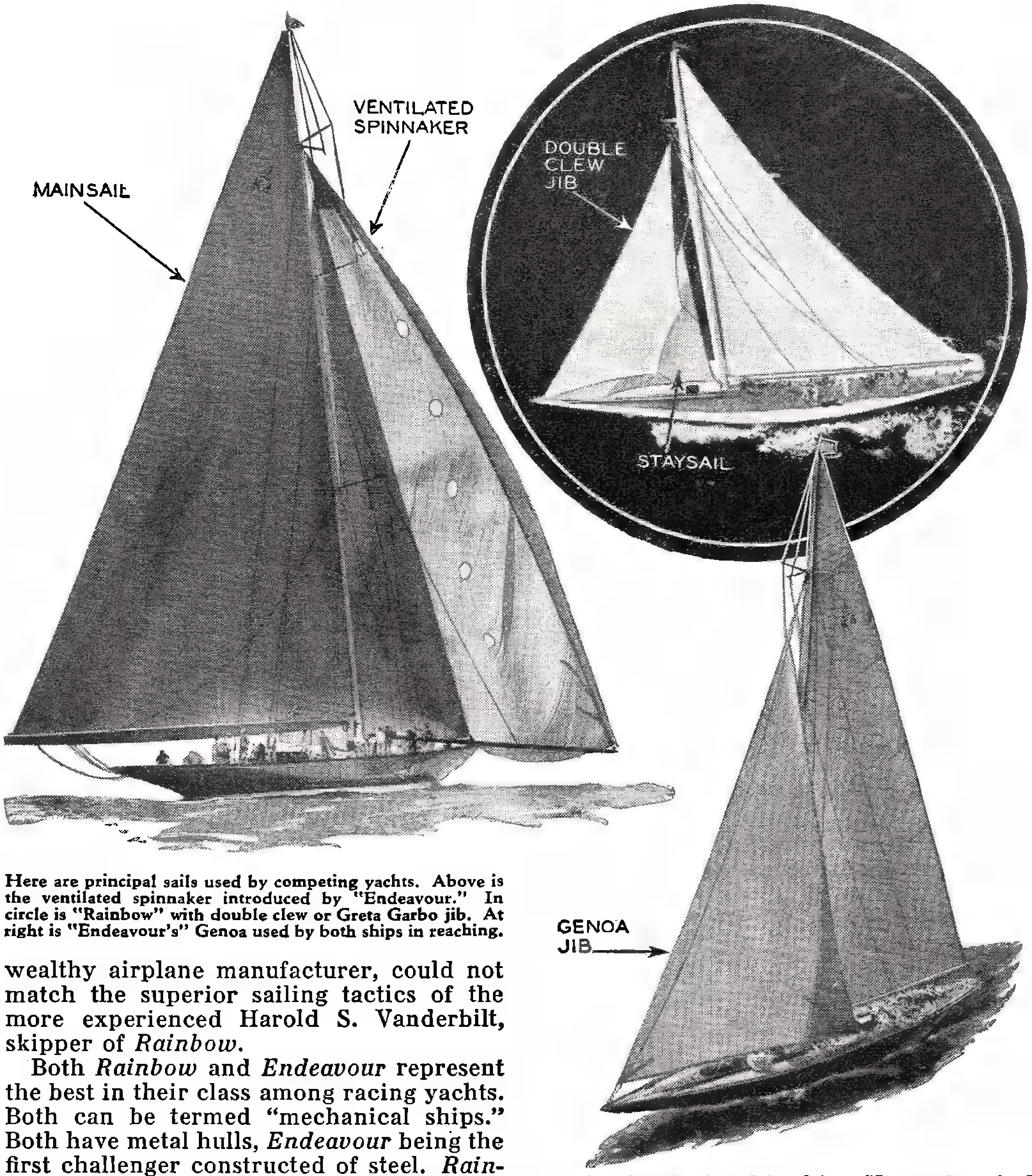
TOTAL SCORE IN 84 YEARS OF RACES
United States Sailed 49 Races; Won 44; Lost 5
Britain and Canada Sailed 49 Races; Won 5, Lost 44.



Rival skippers shake hands. Harold S. Vanderbilt, American defender (left), and T. O. M. Sopwith, challenger.

America's Cup RACES

by James Dvson



Here are principal sails used by competing yachts. Above is the ventilated spinnaker introduced by "Endeavour." In circle is "Rainbow" with double clew or Greta Garbo jib. At right is "Endeavour's" Genoa used by both ships in reaching.

wealthy airplane manufacturer, could not match the superior sailing tactics of the more experienced Harold S. Vanderbilt, skipper of *Rainbow*.

Both *Rainbow* and *Endeavour* represent the best in their class among racing yachts. Both can be termed "mechanical ships." Both have metal hulls, *Endeavour* being the first challenger constructed of steel. *Rainbow's* mast was of duralumin; *Endeavour's* of hollow steel. The British ship had four-speed winches compared to the American's two-speed for handling stays and sheets in various wind pressures.

The British ship was equipped with two speedometers and an electric wind vane and pressure gauge. She was the first challenger to have these modern improvements. Her skipper was able to see the slightest variation in wind instead of relying on his judgment as in the past.

Sopwith called on the science of aeronautics in rigging his ship. He made wind tunnel tests of a model of *Endeavour* to discover the most efficient combination of various sails. Handling of these sails proved to be the leading factor in his defeat.

The ships this year used jib and staysail in going to the windward compared to the former three headsails. The jib used on both ships is what is called a double-clew sail. The after-part of this large sail was cut off and two sheets attached to make it set better. That made it quadrilateral in

(Continued on page 145)

"Chisel" Plow Halts Drifting Soil and Retains Moisture

INVENTED by R. B. Duckett, a farmer from Tyrone, Okla., a new "chisel" plow has proven unusually successful in halting top soil drift and conserving moisture.

Duckett's plow is simply a curved strip of steel, 16 inches long, 3 inches wide and half an inch thick. Furrows are run about 40 inches apart and from 10 to 16 inches deep. These furrows penetrate to the hard pan, bringing up the compact earth which mixes with the top soil to prevent drifting. The depth of the furrows also permits moisture to soak quickly into the ground.

The "chisels" are attached by four bolts to lister beams from which the moldboards and frogs have been removed. These bolts extend through the plow and along the side of the beam and are secured to metal strips on the back of the beam.

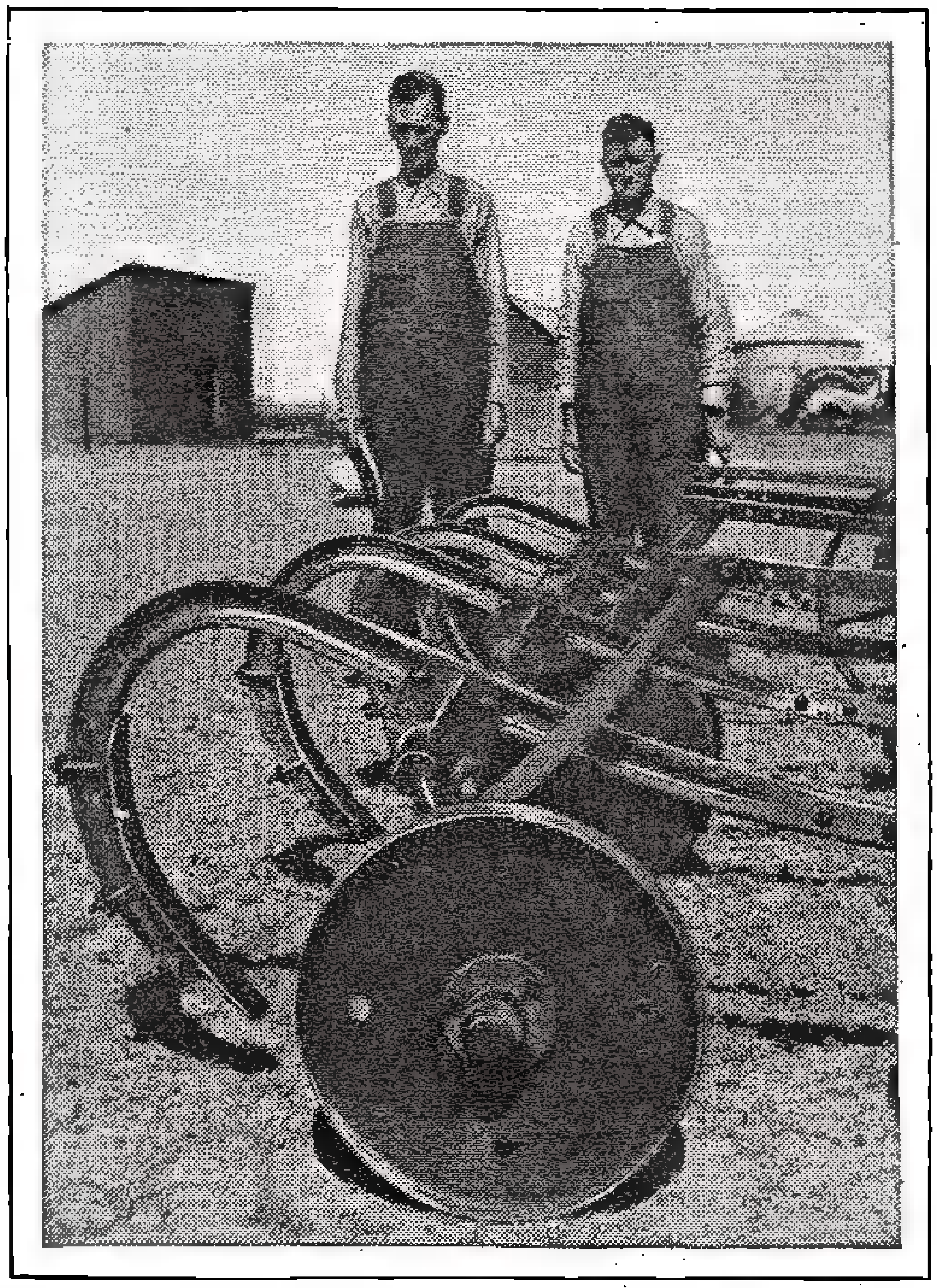


Photo shows the deep-furrow plow built by R. B. Duckett, Oklahoma farmer-inventor. Note how narrow steel plow blades are attached to, and fit the curve of the lister beam.

Coed Designs $2,000,000 Bridge

Photo shows Edith Reed, University of Minnesota engineering student, whose plans for a $2,000,000 bridge won out over professional architects in national competition.

EDITH REED, 21-year-old student in the engineering department of the University of Minnesota, recently astounded the architectural world. Plans which she drew in bed while recovering from an auto accident last spring won out in national competition and were selected for the building of a $2,000,000 bridge at Omaha, Nebraska.

Miss Reed began work on her plans when a friend of the family, president of a Minneapolis contracting firm, furnished her with specifications for the structure and suggested that she draw up an architectural design to while away the time.

Dynamite Used to Study 'Quakes

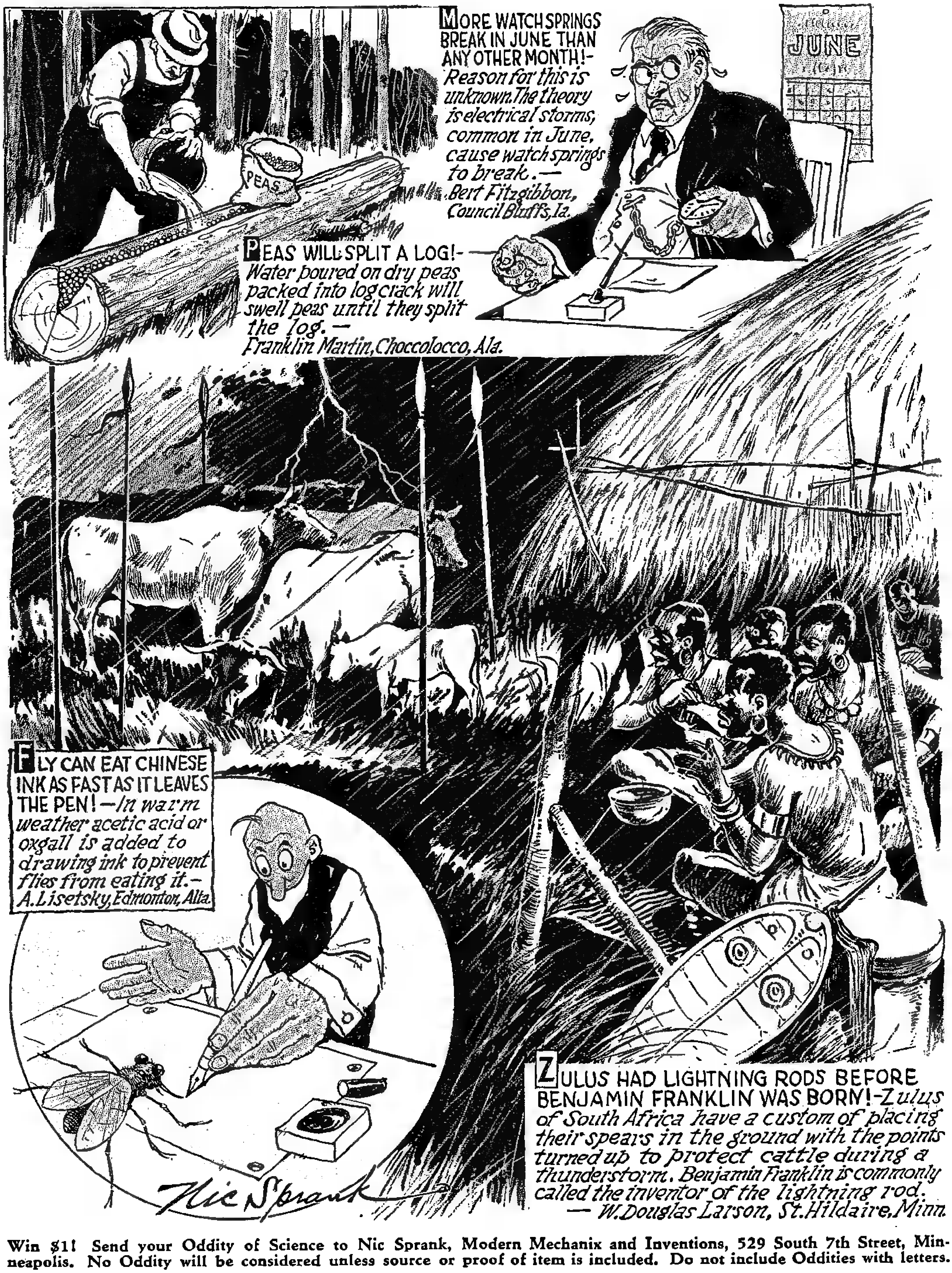
BY SETTING off small charges of dynamite, west coast scientists set up miniature earthquakes whose actions are recorded for future study by sensitive instruments mounted on a special truck.

The effects of these explosions, produced by charges varying from one to forty pounds, are studied by the investigators who have located underlying rock strata as deep as 40,000 feet below the surface. The apparatus also reveals earthquake faults and permits study of the velocity with which the earth tremors are produced.

EXPLOSIVES
DANGEROUS

With this truck laboratory, west coast scientists secure valuable data on earthquake faults and velocity of tremors.

ZULUS *Invented* LIGHTNING *Rods*— *Nic Sprank* in ODDITIES *of* SCIENCE



MORE WATCH SPRINGS BREAK IN JUNE THAN ANY OTHER MONTH!—*Reason for this is unknown. The theory is electrical storms, common in June, cause watch springs to break.*—*Bert Fitzgibbon, Council Bluffs, Ia.*

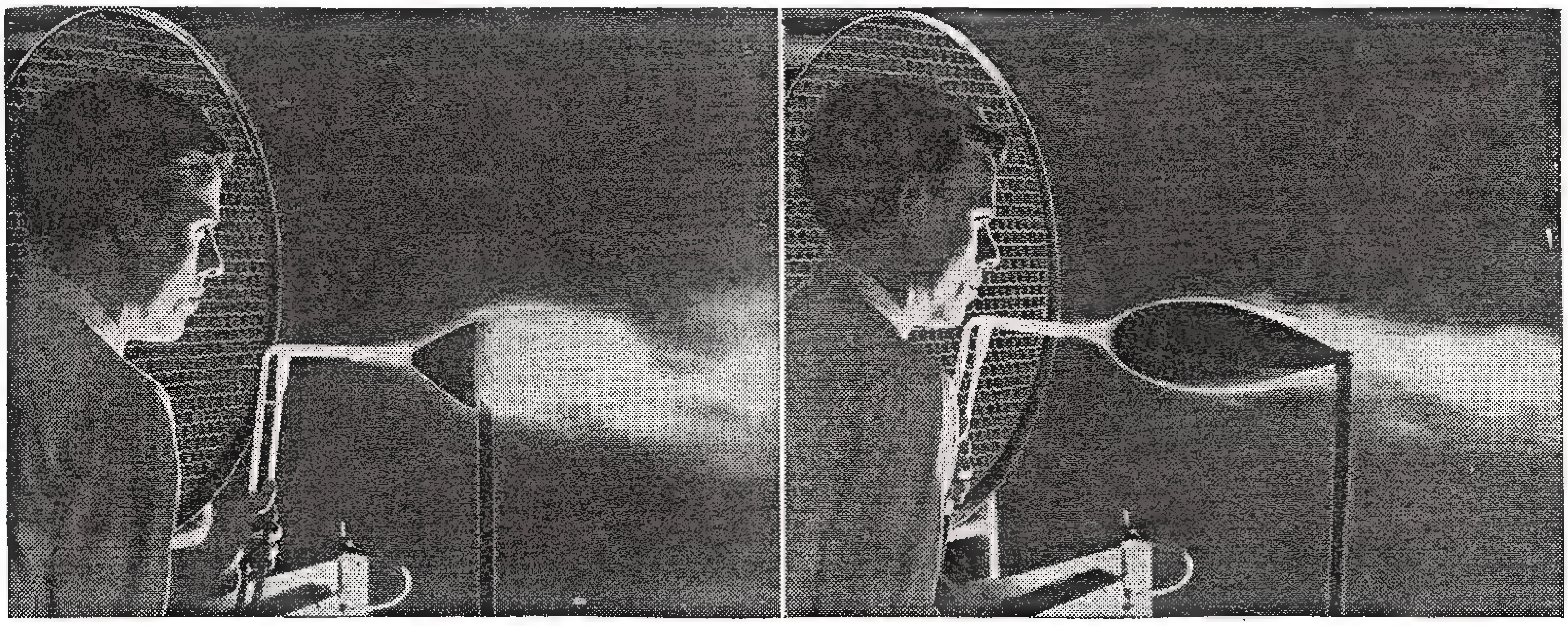
PEAS WILL SPLIT A LOG!—*Water poured on dry peas packed into log crack will swell peas until they split the log.*—*Franklin Martin, Choccolocco, Ala.*

FLY CAN EAT CHINESE INK AS FAST AS IT LEAVES THE PEN!—*In warm weather acetic acid or oxgall is added to drawing ink to prevent flies from eating it.*—*A. Lisetsky, Edmonton, Alta.*

ZULUS HAD LIGHTNING RODS BEFORE BENJAMIN FRANKLIN WAS BORN!—*Zulus of South Africa have a custom of placing their spears in the ground with the points turned up to protect cattle during a thunderstorm. Benjamin Franklin is commonly called the inventor of the lightning rod.*—*W. Douglas Larson, St. Hildaire, Minn.*

Win $1! Send your Oddity of Science to Nic Sprank, Modern Mechanix and Inventions, 529 South 7th Street, Minneapolis. No Oddity will be considered unless source or proof of item is included. Do not include Oddities with letters.

Scientist Shows How Streamlines Determine Speed Ratios



Visual proof of the benefits of streamlining are shown in the photos above. Left—Note how broken smoke stream sets up suction drag at stern of unstreamlined object. Right—How streamlines cut air resistance to a minimum.

SCIENTIFIC principles having a direct bearing upon speed ratios—not the mere desire to create unusual designs—are responsible for the growing vogue of streamlined automobiles.

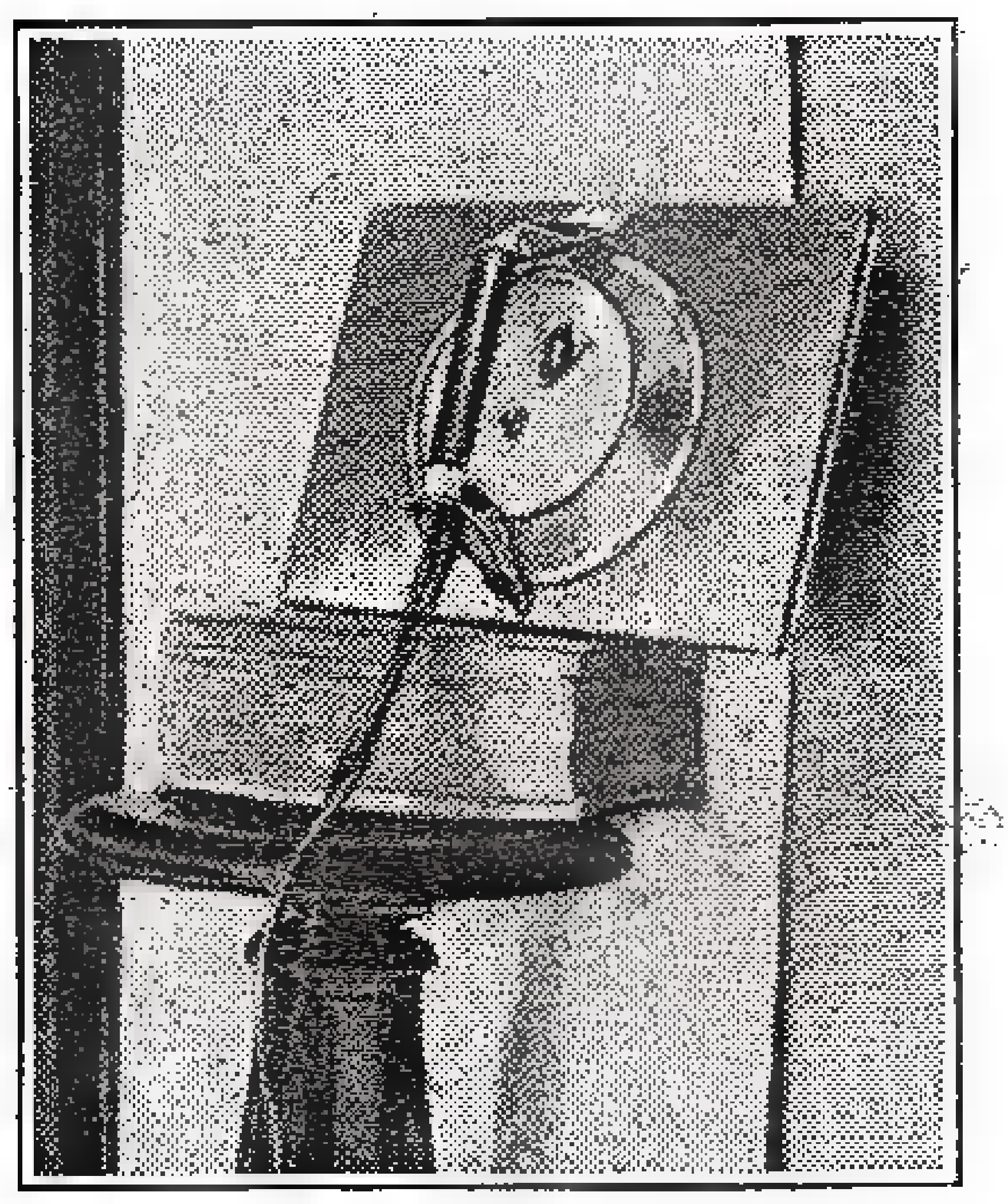
At a recent demonstration at the Franklin Institute in Philadelphia, Ray McClarren, A. E., Aviation Section, presented a series of graphic tests showing how the shape of an object determines its speed.

Jets of smoke were directed against objects of various shapes to give visual proof of the action of the air currents. When the smoke stream was directed against objects with blunt sterns, the air currents were split up, making the suction drag plainly visible. "Tear drop" formations, however, showed virtually an unbroken smoke stream, indicating higher speeds through lessened air resistance.

Current Heats Wallpaper Steamer

OLD wallpaper may be quickly removed with a new electrical steamer which plugs into any light socket. Water conveyed from the nearest faucet via a long rubber tube is quickly converted into steam by an electric heating element.

The device is applied to the wall with hand pressure and is said quickly to loosen any number of layers of paper. Women may easily operate the device.



This wallpaper steamer may be plugged into any light socket. The device weighs three lbs.

Newsboy Is Walking Display Rack

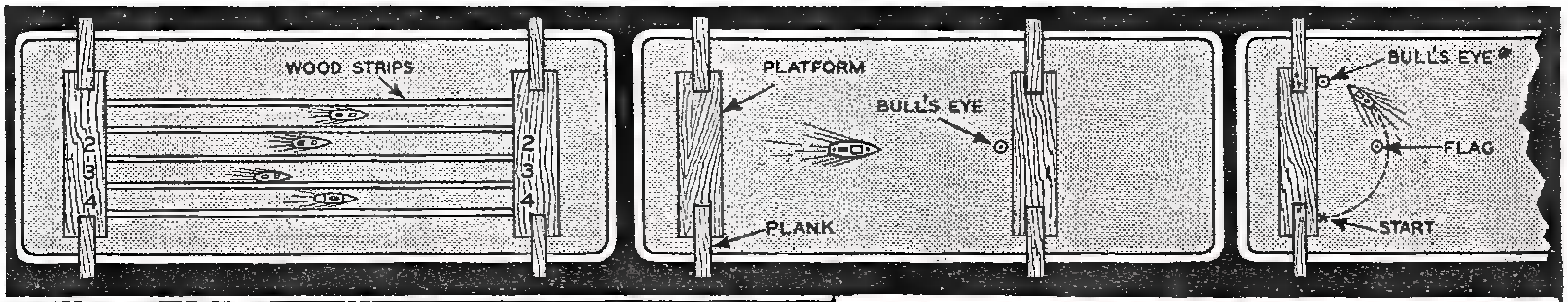
A LOS ANGELES newsboy with an extensive motor trade has devised a simple method of displaying his headlines.

A copy of the latest edition hangs on his back, held by two paper clamps which are tied to the ends of a short piece of tape, worn around the neck.

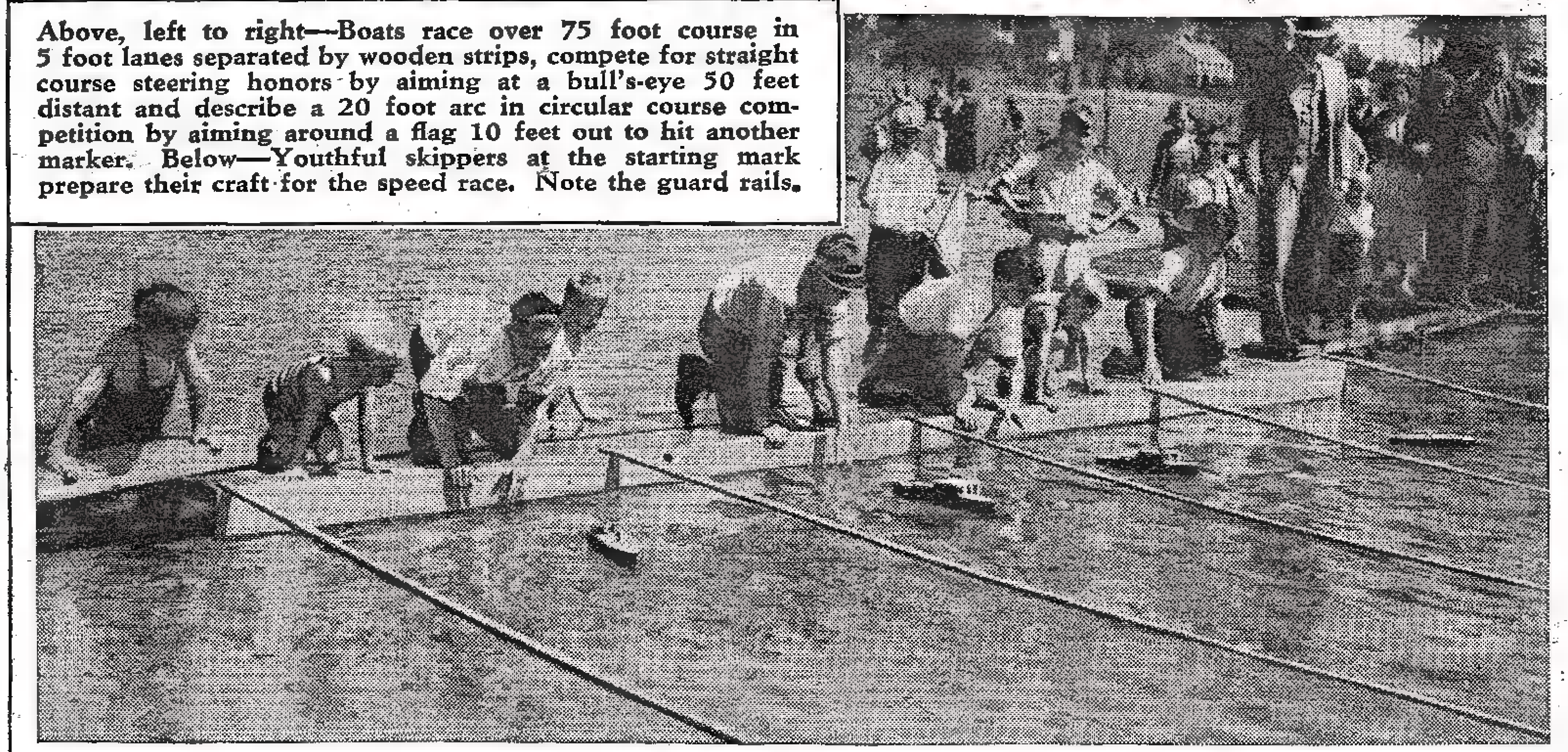
As he weaves in and out among the automobiles, the headlines are plainly visible to motorists. In addition to stimulating sales, the displayed paper also adds to his safety by making him visible at greater distances.

Photo shows how a Los Angeles newsboy stimulates sales by displaying a copy of the latest edition on his back.

Model Power Boats Race in Wading Pool



Above, left to right—Boats race over 75 foot course in 5 foot lanes separated by wooden strips, compete for straight course steering honors by aiming at a bull's-eye 50 feet distant and describe a 20 foot arc in circular course competition by aiming around a flag 10 feet out to hit another marker. Below—Youthful skippers at the starting mark prepare their craft for the speed race. Note the guard rails.



ONE of the highlights of the Seattle school year is the annual model boat regatta, in which tiny power boats race over measured courses in a convenient wading pool.

To be eligible for competition, each boat must have been made in the manual training shops of one of the Seattle schools. Craftsmanship is emphasized and is one of the factors regulating awards; but otherwise there are no restrictions as to the size of the boat or the size and number of its power plants, providing they meet requirements of common safety.

Boats are judged for speed over a 75-foot course divided into 5-foot lanes by strips of wood in the water. These strips keep boats in their lanes and cut down backwash which might throw the other boats off their courses.

In the straight course steering event the youthful skippers attempt to hit a flag, or bull's-eye, 50 feet distant from the starting line.

The concluding event involves steering a circular course around a flag placed 10 feet out and describing a 20-foot arc to hit a bull's-eye. Boats touching the flag are disqualified.

Ship on Wheels Scales Mountains

TRAVELING from West to East Prussia, a small German steamer leaves the water at frequent intervals and literally scales five mountains before the trip is completed. Twenty locks would be required if the vessel were to make the entire voyage by water; but engineers have solved the problem by devising a wheeled carriage and laying sets of tracks over the mountains.

The carriage tracks extend down into the canal, making the transfer of the ship from water to rail a comparatively simple matter.

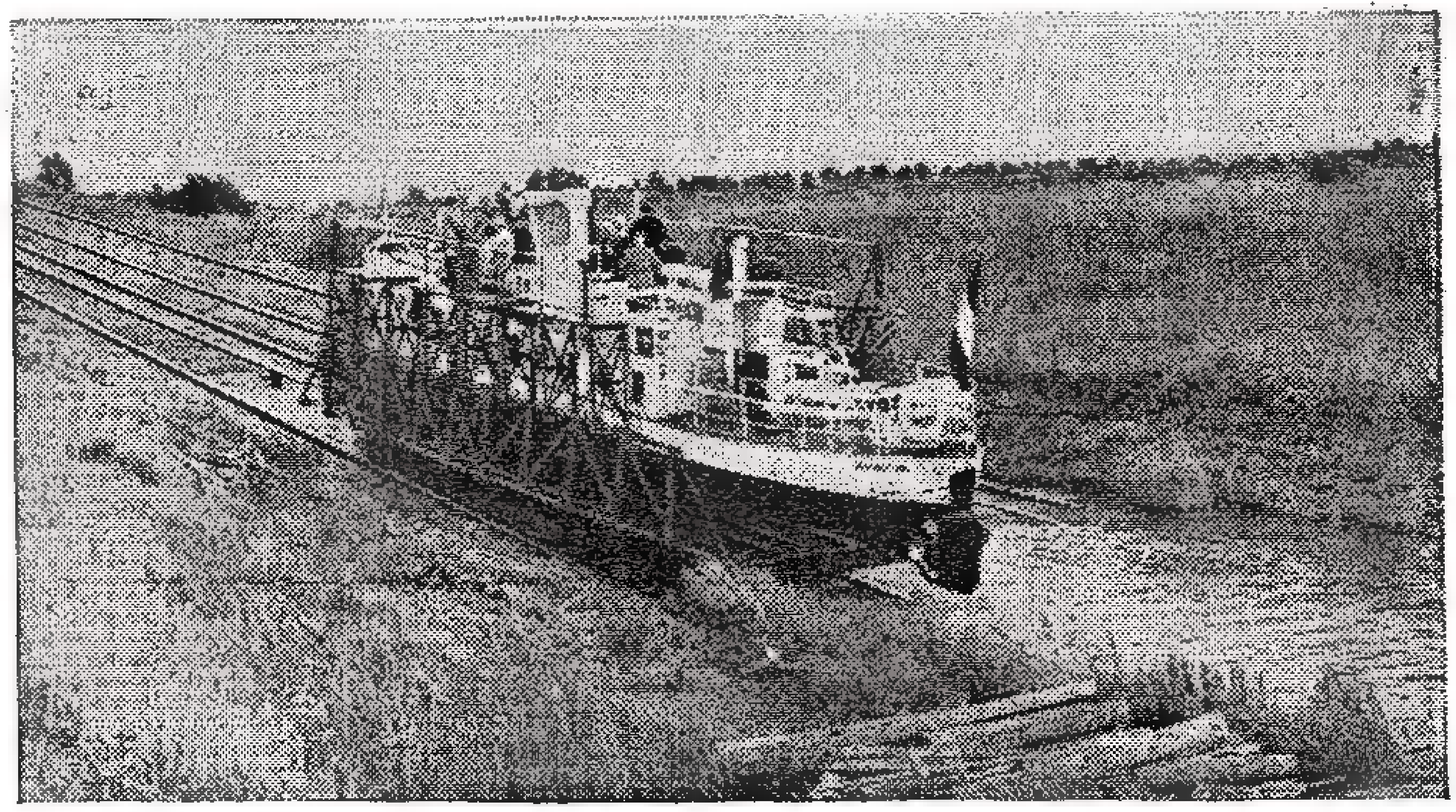


Photo above shows small German steamer mounted on the carriage which conveys it over the mountains, five of which are scaled on complete trip.

Heroism at sea is usually more evident among passengers than crew, declares the author. This woman, survivor of the Morro Castle, braved icy waters by diving overboard from the burning ship. She was picked up by a rescue ship.

Fire

by

CAPTAIN FELIX RIESENBERG

An authority on sea topics, Captain Riesenberg sailed the oceans of the world in sail and steam. He is a member of the U. S. Naval Institute and the Society of Naval Architects and Marine Engineers.

CAN SCIENCE

IN THE dark hours before dawn that terrifying word "Fire!" aroused passengers on board the *Morro Castle* from their peaceful slumbers. In the radio room the operator tapped out the sea's signal of distress—"SOS." Within an incredibly short time the ship, a modern liner, was a blazing holocaust.

Passengers and crew jumped for their lives. Some escaped in lifeboats. Some were picked up by rescue ships. A few swam eight miles through the cold, choppy sea to the safety of the New Jersey shore. But when death's toll was counted, the lives of 132 persons were charged to this latest disaster at sea.

Few passengers were saved in the lifeboats of the Morro Castle. Members of the crew were predominant in the boats, such as this one, that reached the Jersey shore.

The burning of the *Morro Castle* vividly brought before the public the ever-present danger of fire at sea. That public now looks to the government, to steamship lines and to science to reduce this most dreaded hazard of the sea.

History shows that one by one other hazards, resulting in disaster, have been reduced to negligible percentages. The sinking of the *La Bourgogne* in 1898 with a loss of 562 lives resulted in improved discipline and training of crews. The collision of the *Republic* and the *Florida* in 1909 showed the value of radio and led to its compulsory use. The loss of 1,517 persons on the *Titanic* in 1912 after collision with an ice-

at Sea!

END DISASTERS?

Accusations, protests, and investigations have followed every major tragedy at sea. Will the Morro Castle's burned hulk leave a lesson for the world? This article discloses the need for greater safety at sea.

berg resulted in the establishment of the International Ice Patrol. More recently the *Vestris*, in which 110 persons met death, showed the necessity of rigid inspection of ships.

Radio beacons, echo depth sounders, and submarine bells have reduced the chance of grounding. Fire in the holds and bunkers of cargo craft is now controllable by the use of steam, carbon dioxide gas and foam spreading apparatus. But fires above the cargo holds, in the congested passenger quarters of the most modern ships, are still to be conquered.

Fires on the high seas in modern vessels are not unusual and are not among the things that cannot happen. Any wisp of smoke, the slightest indication of flame, may be the beginning of a major tragedy. The *Morro Castle* will serve to further drive home a warning and must give everyone a definite sense of the grave danger involved in any fire at sea.

Whatever the original cause of the *Morro Castle* fire, carelessness, defective wiring, explosive brass polish, oil fumes, or a com-

Above, an aerial view of the Morro Castle afire with rescue ships in the background. The forward end of the ship was scarcely damaged by fire, the officers remaining there safely until taken off by the coast guard. In lower photo National Guardsman examines undamaged clothes left by passengers on stern when ship was abandoned.

(Continued on page 135)

Silver Recovery Process Saves Movies $1,000,000 Yearly

Flakes of silver in pile on street were recovered from old film developing solution by new electrolytic process. After melting, they are cast into 60-lb. bars shown at left of crucible.

OVER a million dollars worth of silver a year is being salvaged by Hollywood movie laboratories. A few years ago this silver, dissolved in solutions used during the film-developing process, was thrown away as waste.

A new electrolytic silver recovery process has been found which will collect the silver washed off from exposed film.

The solution is run through a series of boxes, each of which contain a number of ten-inch square Monel metal electrodes connected to a direct current supply. Just as in electro-plating, silver is taken out of the solution and deposited on the electrodes.

About once a week, when a one-eighth inch thick layer of silver has formed on the plates, they are removed and placed in an oven. Heat makes the silver crack away from the Monel metal in flakes. These flakes are melted into 60-pound bars and shipped to the mint.

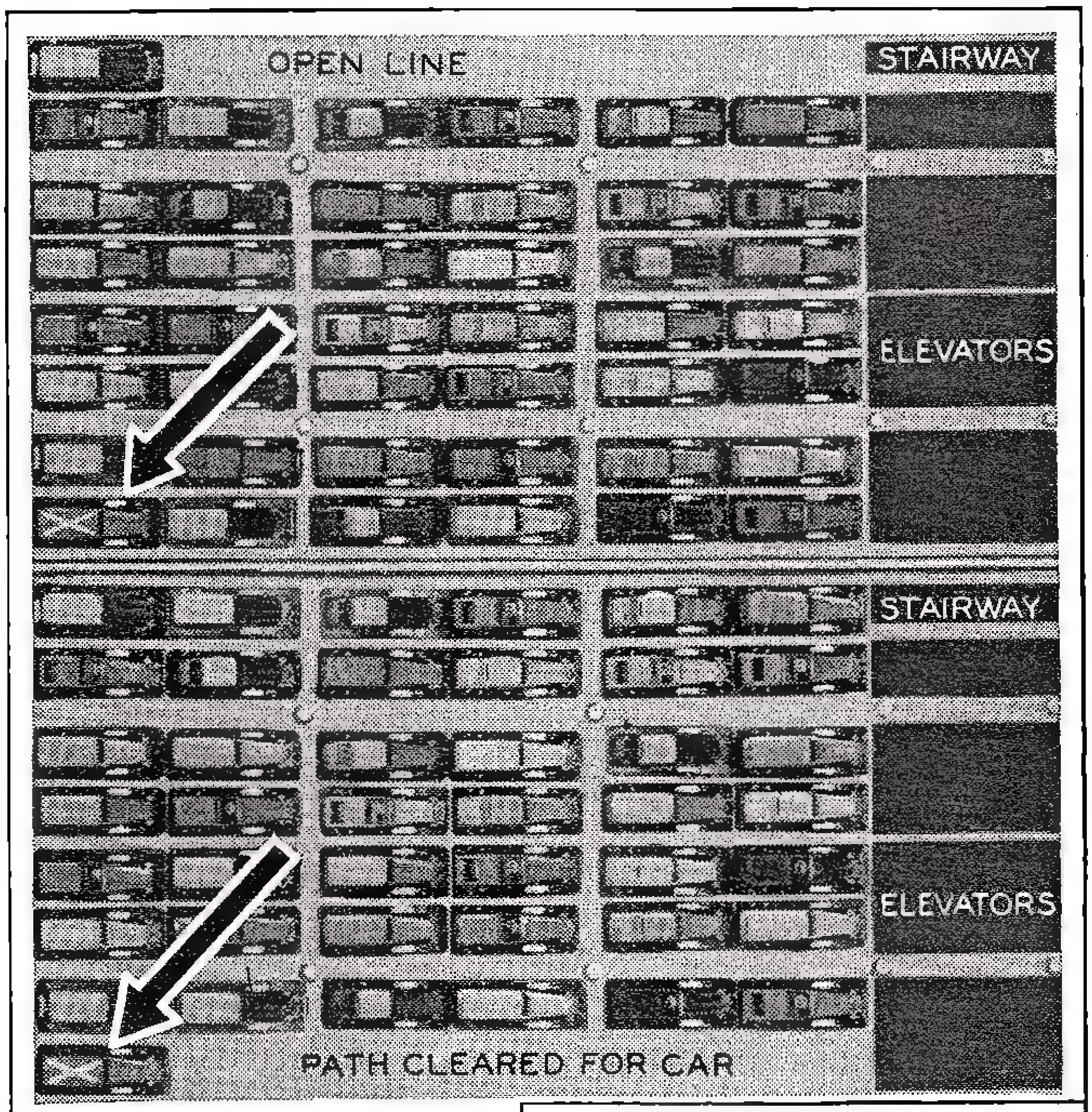
The solution is then run off into settling tanks, where any silver still in solution will settle to the bottom. From time to time the sludge is dried and sent to a smelter.

Garage Capacity Almost Doubled by New Mechanical Parking Equipment

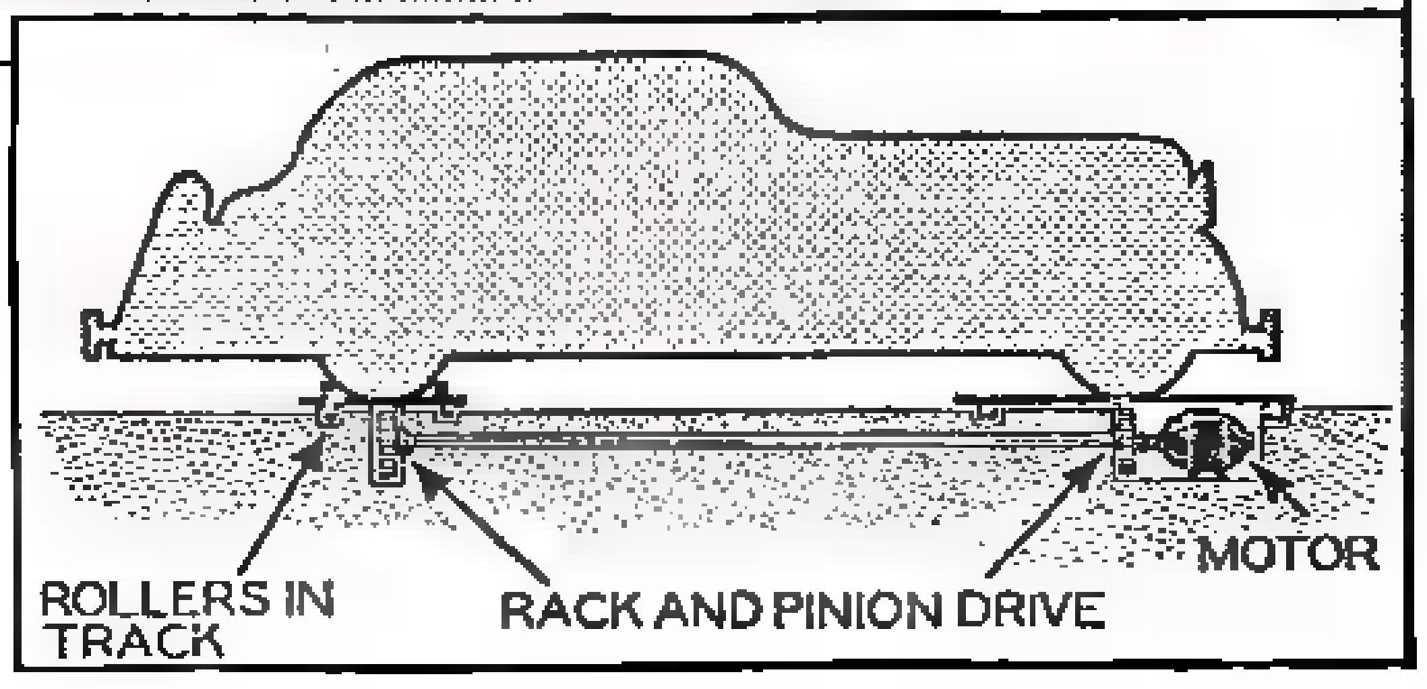
AUTOMOBILES can be parked into any area so compactly that bumpers and fenders almost touch, yet driven out in less than a minute with the aid of a new mechanical parking device. The inventor, Eugene S. Taylor of Chicago, asserts that the present parking capacity of any garage or parking lot can be increased as much as 80 per cent with the new equipment.

Each automobile is driven onto a pair of flat steel cars rolling on tracks below the floor.

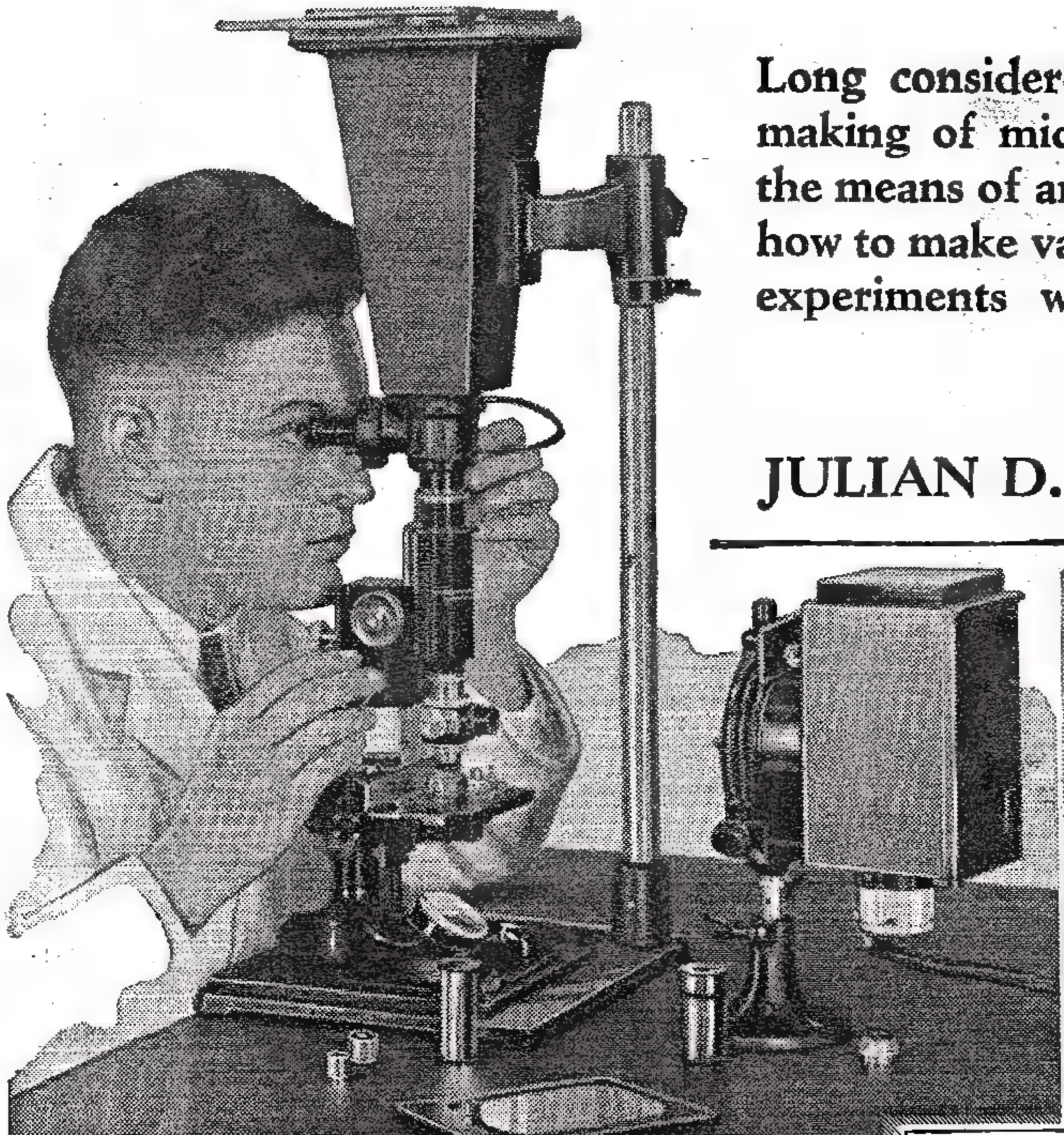
The end flat cars in each row have racks and pinions driven by electric motors. Auto moving units in any row are connected to or disconnected from these end cars by electric control equipment. Any number of cars in one or all rows can be moved sideways a distance of six and one-half feet in seven seconds, to open up a lane for a car at any point. The new system eliminates the necessity of leaving space behind or ahead of each double row of parked cars in garages at present. Only one lane is needed for the entire garage.



By pressing control buttons of new parking device, garage attendant can move entire rows of cars sideways 6½ feet to clear lane for car. In upper picture, arrow indicates car to be driven out; below is lane cleared for this car. Auto-moving mechanism is shown at the right.



Taking Micro-Photos With Your Camera



Long considered an expensive hobby, the making of micrographs is now well within the means of amateur fans. This article tells how to make valuable records of microscope experiments with inexpensive equipment.

by

JULIAN D. CORRINGTON, Ph.D.

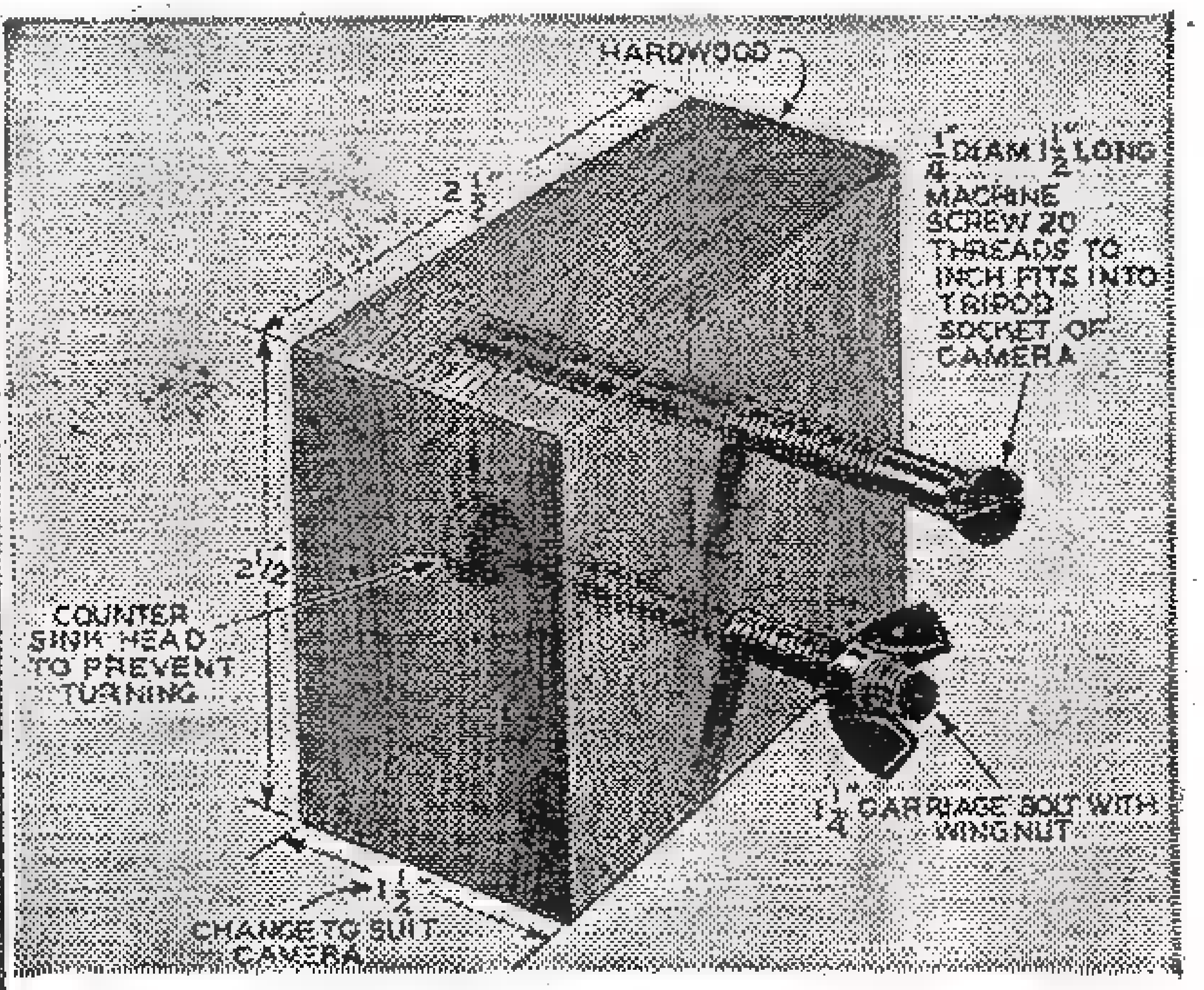
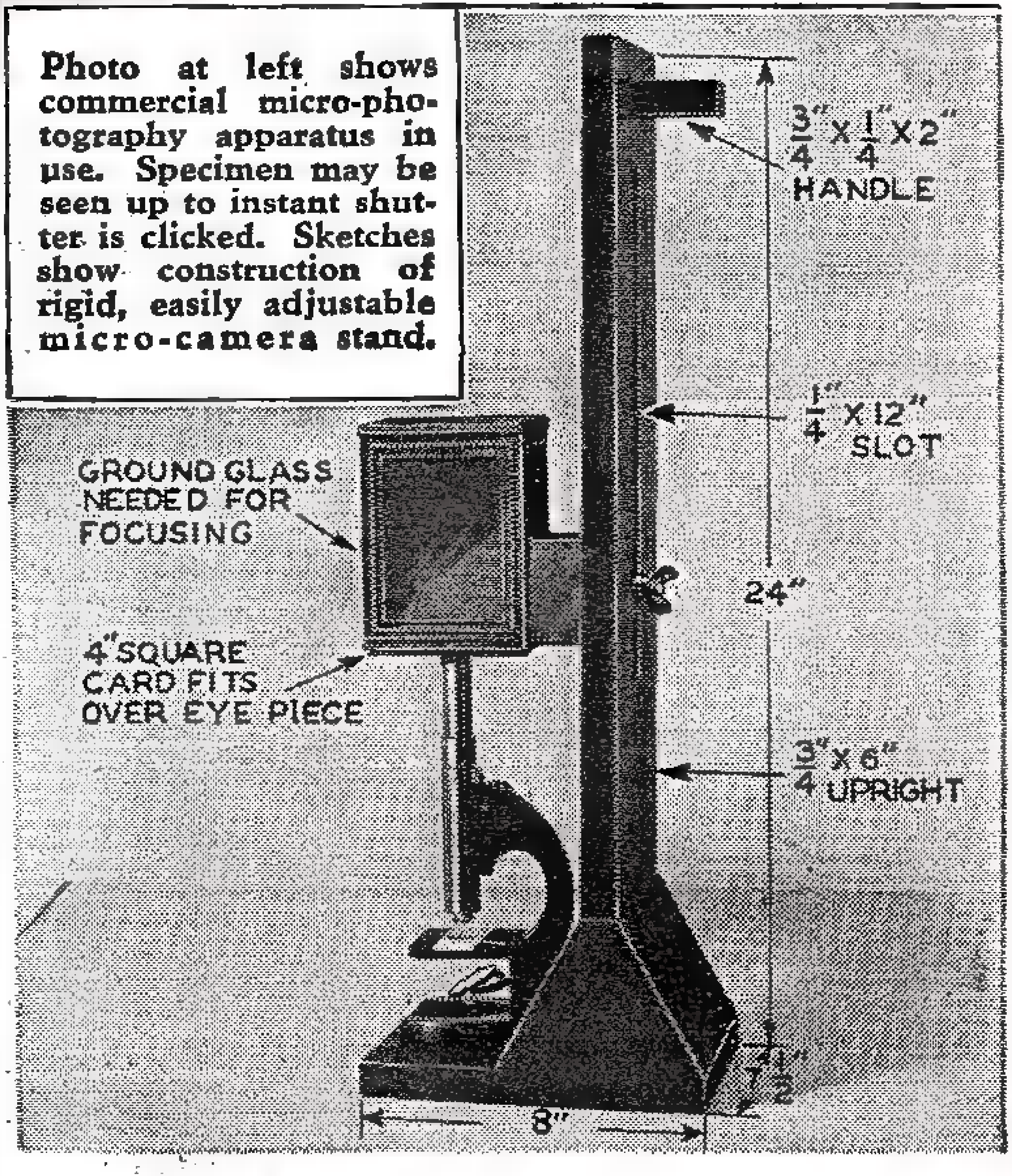

HARDWOOD
$\frac{1}{4}$" DIAM $1\frac{1}{2}$" LONG MACHINE SCREW 20 THREADS TO INCH FITS INTO TRIPOD SOCKET OF CAMERA
$2\frac{1}{2}$"
$2\frac{1}{2}$
COUNTER SINK HEAD TO PREVENT TURNING
$1\frac{1}{4}$" CARRIAGE BOLT WITH WING NUT
$1\frac{1}{2}$
CHANGE TO SUIT CAMERA

Photo at left shows commercial micro-photography apparatus in use. Specimen may be seen up to instant shutter is clicked. Sketches show construction of rigid, easily adjustable micro-camera stand.


$\frac{3}{4}$" X $\frac{1}{4}$" X 2" HANDLE
$\frac{1}{4}$" X 12" SLOT
GROUND GLASS NEEDED FOR FOCUSING
24"
4" SQUARE CARD FITS OVER EYE PIECE
$\frac{3}{4}$" X 6" UPRIGHT
$7\frac{1}{2}$"
8"

Camera slides up and down in slotted mounting to permit focusing. Use ground glass screen at back of camera.

CONTRARY to accepted belief, fascinating photographs which serve as a permanent experiment record may be taken by the amateur microscopist with no other equipment than an ordinary camera and a low cost microscope.

Naturally, expensive machines will give better results but excellent pictures may be secured, nevertheless, with a miniature model microscope and a common box type camera.

The initial step in hooking up the two instruments is to make or purchase a rigid, perfectly aligned stand which will serve as a vertical support for the camera. A simple, easy-to-build stand is shown in the accompanying illustrations.

The next step is to make a light screen for the microscope from a piece of black cardboard, from 3 to 4 inches square. Remove the ocular from your scope, place it upright in the center of the card and trace around it with a pencil. Then cut out the circle thus made, push the ocular through and replace the device in the microscope.

If the back of your camera is not provided with a ground glass for focusing, one will have to be cut or purchased. It should lie snugly within the moulding, or frame, that appears just inside the back of the camera box.

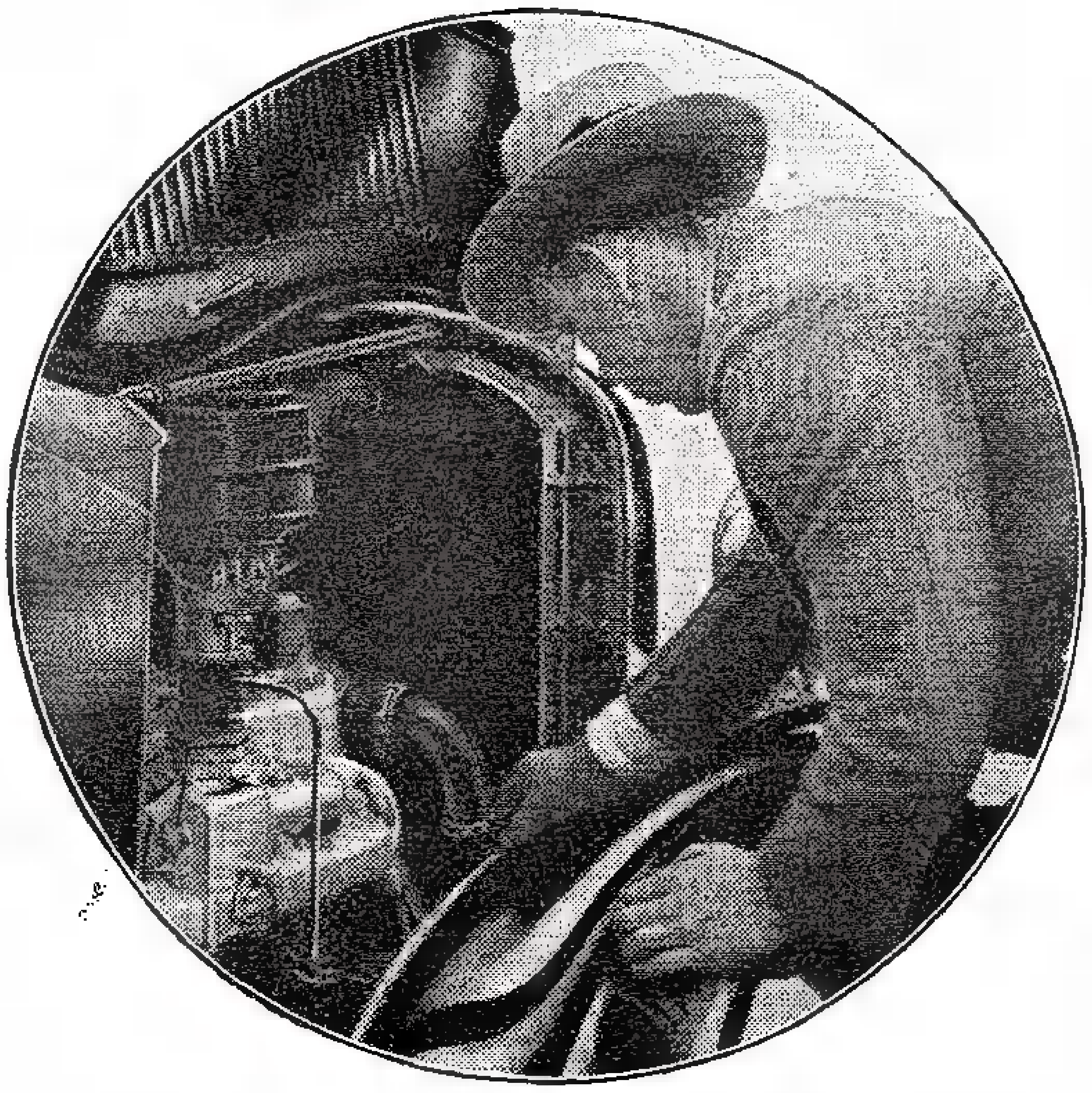
A light filter which will transmit only green light from the source of illumination to the photomicrographic outfit should also be made. This is done by inserting a piece of green cellophane between two thin plates of glass, such as lantern slide blanks, and fastening them with gummed tape by the passe partout method. A strong light source is essential.

(Continued on page 140)

PREPARING YOUR CAR

by **PROF. B. J. ROBERTSON**

Mechanical Engineering Department
University of Minnesota



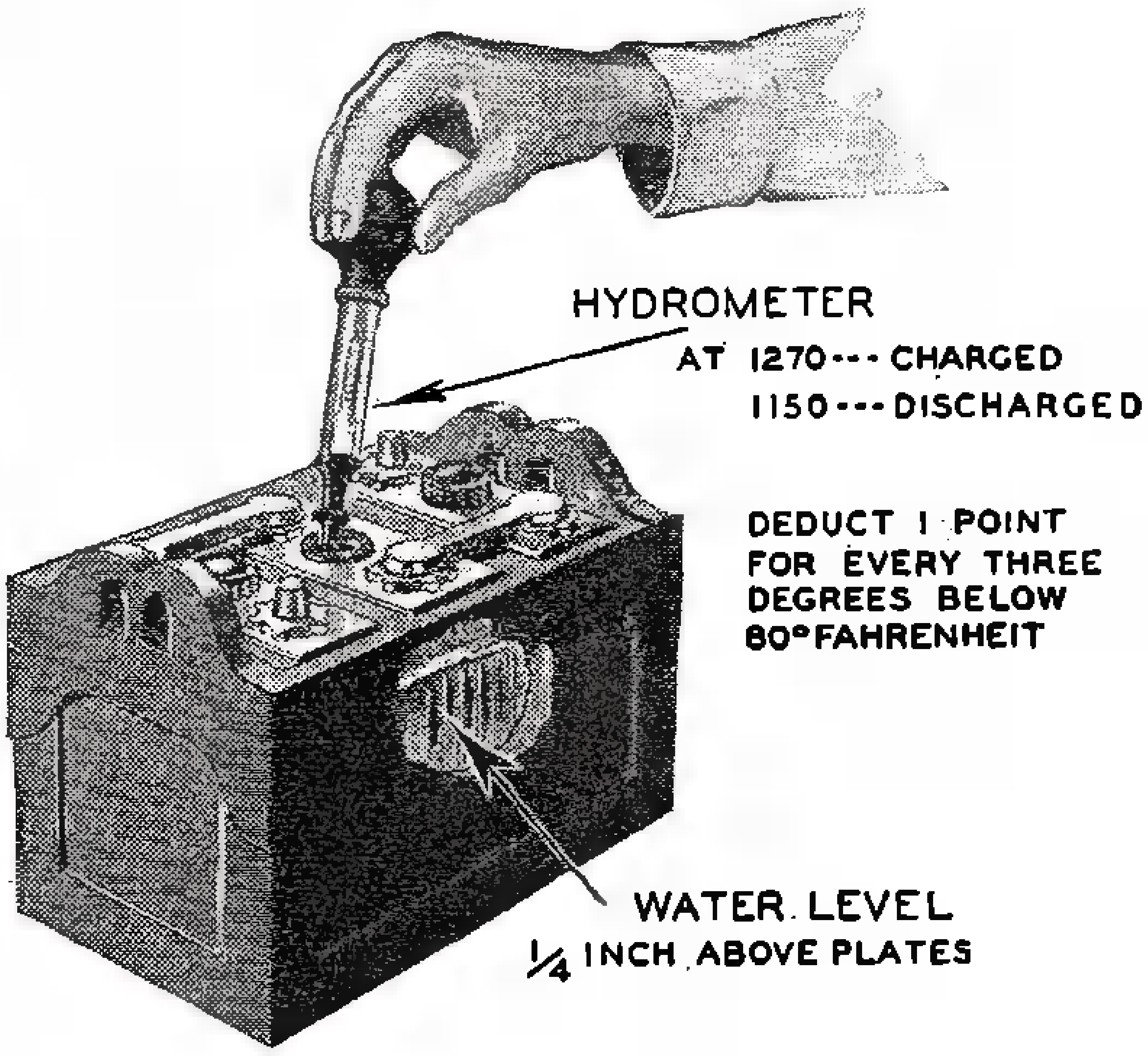
Flush out and clean cooling system with sal soda, then replace all soft or damaged hose connections, before putting anti-freeze solution into your car radiator this winter.

TROUBLE-FREE winter driving can be obtained only by careful attention to the car before cold weather sets in. Too many automobile owners, putting off necessary winter preparations in the hopes of saving a little money, are caught unprepared by an unexpected cold spell.

The cooling system is generally the first to be affected by wintry temperatures. Water in the lower hose connection freezes, stopping circulation through the radiator. Adding anti-freeze compounds with the engine in this condition is worse than useless; the lower water connections must first be completely thawed out. Hot water poured on the outside of the frozen pipes will be found very effective. Covering the radiator front with a blanket keeps some of the exhausted steam inside the hood where it may heat the air surrounding the frozen pipes until they thaw enough to allow the water to circulate.

The wise motorist anticipates the cold snap and prepares his cooling system before hand. Of the many compounds available, each has its advantages and drawbacks.

Denatured alcohol is used very extensively. The addition of a sufficient quantity will effectively prevent freezing at any temperature encountered in the civilized world. It does not injure either the engine or radiator, but alcohol vapors or the liquid, if spilled, will attack the finish on a large number of cars. Boiling at a temperature of about 180 degrees, the losses by evaporation necessitate frequent additions to the



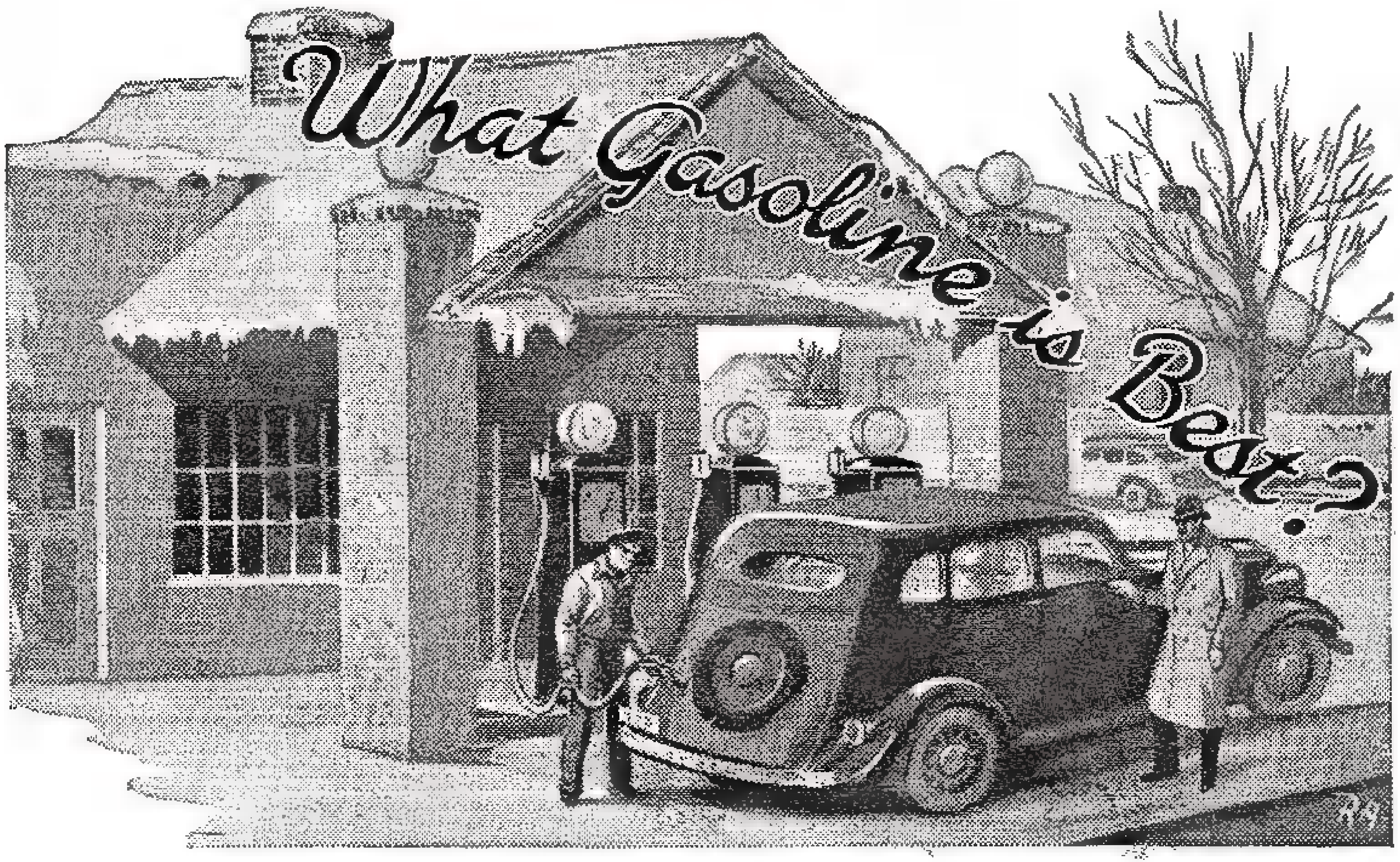
Inspect the car battery weekly during cold weather. Make temperature corrections to hydrometer reading as shown above. Add distilled water before, not after using the car.

What Anti-freeze Solution Shall I Use?

ALCOHOL Denatured Wood or Methanol	**Most commonly used anti-freeze. Evaporates rapidly on long drives. Cheap, effective if enough is used. Withstands much lower temperatures than denatured product. Poisonous, with fumes often producing nausea. Does not harm engine.**
GLYCERINE	**When pure, does not attack engine or block. Does not evaporate in engine. Mixes readily with water.**
KEROSENE, DISTILLATE, OR LUBRICATING OIL	**Cost low. Favorably increases operating temperature of engine, delivering more heat to auto heater. Inflammable when hot. Injurious action on rubber, requiring yearly hose replacement. Remove all water from radiator before pouring in oils. No. 10 lubricating oil, cheap grade, or crankcase waste, gives same results with less danger of fire.**
STRAINED HONEY	**Thicker than glycerine. Much greater proportion needed to prevent freezing. Extremely thick when cold, interfering with circulation.**
ETHYLENE GLYCOL	**Much thinner than glycerine, noncorrosive, and will not boil away in car. Ethylene glycol mixture (such as Prestone) is ideal for winter trips.**
CALCIUM CHLORIDE	**Generally obtained in inexpensive commercial solutions. If engine gaskets are leaky, corrosion may take place. Should not be spilled on electric wiring or car finish.**

for WINTER DRIVING

With the advent of below-freezing winter temperatures, new problems confront the motorist. Radiator and battery must be protected against freezing, oil and grease changed, and consideration given to the gasoline being used. A noted authority here tells just how to foil "King Winter."


What Gasoline is Best?

LOW GRADE—if car starts easy, gives no carbon knocks.
REGULAR—if car is hard to start or misses with cheap gas.
HIGH TEST—for new high compression cars with good rings.
ETHYL—stops knocks. Aids in burning out carbon deposits.

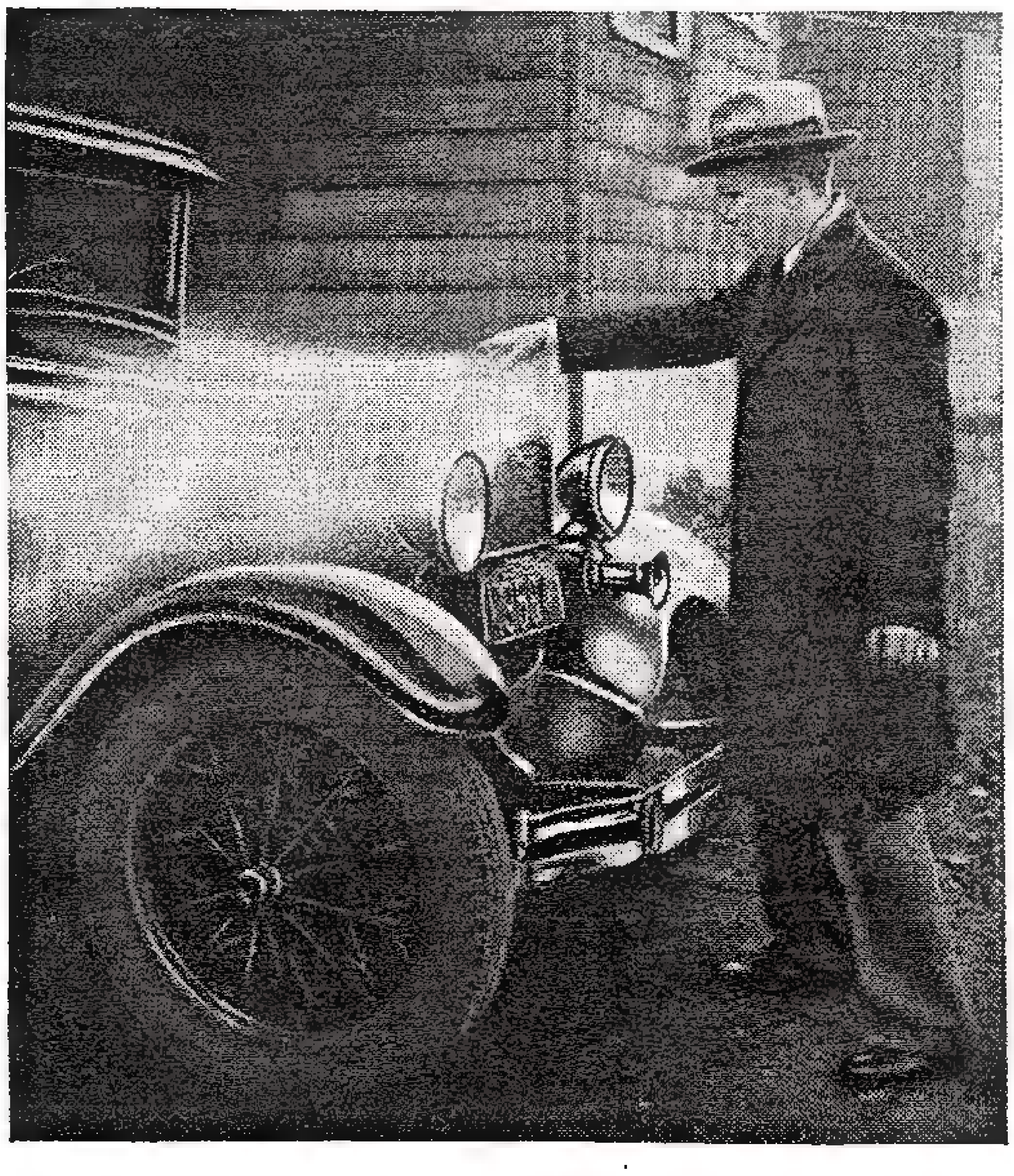
radiator, especially where drivers cover long distances daily.

Wood alcohol and Methanol—an alcohol made from coal—are even more effective than the denatured product. A 50% solution of denatured alcohol freezes at 18 degrees below zero while a 50% solution of wood alcohol does not freeze until 40 degrees below zero is reached. Wood alcohol is poisonous; its fumes, while not so offensive to many as those of the denatured product, sometimes produce a nausea.

Glycerine, when distilled and refined properly, does not attack the radiator or engine block. Be sure that the glycerine you buy is pure. In adding it to the radiator, it is much better to stir the glycerine and water together in an outside container. Some manufacturers market it ready-mixed with water in cans. When once in a solution with a small proportion of water, it mixes readily with additional water, and may be poured directly into the radiator.

Ethylene glycol is being manufactured in quantities for radiator protection. It is much thinner than glycerine, is not corrosive and like glycerine will not boil away at temperatures more than 150 degrees above the boiling point of water. Only water need be added during the winter so long as there is no loss by leakage. This anti-freeze is ideal for long winter drives.

Calcium chloride solutions are very inexpensive and may be made freeze proof at 50 degrees below zero. While less corrosive than a salt and water solution, they are very troublesome when used in an automobile cooling system. If gaskets are leaky, corrosion takes place between the cylinder head and the block, oftentimes making it almost impossible to remove the head. Do not spill the solution on the ignition wiring because short circuiting may result.

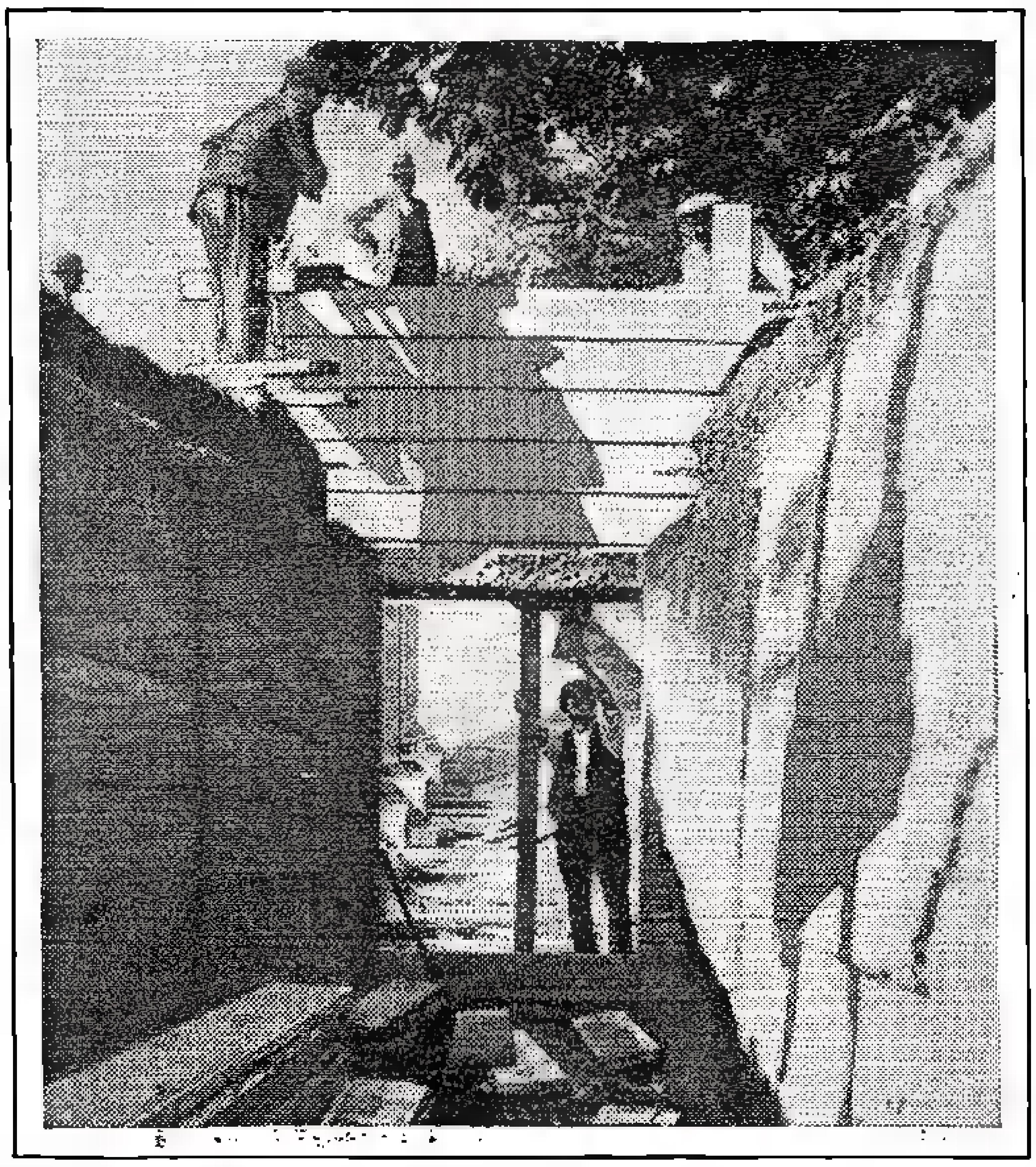


Steaming radiator is sign of careless, unprepared motorist. Put anti-freeze in car early, to be prepared for first cold spell, then check often to keep it at proper concentration.

The radiator and cooling system should be drained and thoroughly flushed out be-

(Continued on page 151)

British Bomb-Proof Shelter Anticipates Future Air Raids



View of British bomb-proof shelter being built at Ashford, Middlesex, as seen from tunnel leading into it. Underground chamber is 18 ft. deep, 30 ft. long, and 40 ft. wide.

ANTICIPATING aerial bombing in the next war, British housing contractors in collaboration with the government are constructing a bomb-proof, gas-proof shelter in connection with a new housing project at Ashford, Middlesex, England.

Located within easy reach of all homes in the new settlement, the shelter will provide refuge during air raids for 300 persons. A tunnel will lead to it from the housing project.

The shelter itself is 30 feet wide and 40 feet long, with the floor 18 feet below the ground. Alternate layers of concrete and soil over the subterranean room insure protection against even the heaviest of aerial missiles. Upon completion, all signs of construction work above ground will be removed as an added safeguard.

Folding Ladder Fits Varied Needs

OF REAL value to carpenters and painters as well as the average home owner is a universal folding ladder recently placed on the market. The hinged steel joints are constructed to permit setting up of the ladder on stairs, slopes, or other awkward positions with no danger of slipping.

An ordinary stepladder is obtained by using only the center hinge; the next two hinges give a high stepladder with a platform at the top; a horizontal platform which can be used as a workbench in the shop or garage is provided with the two lowest hinges.

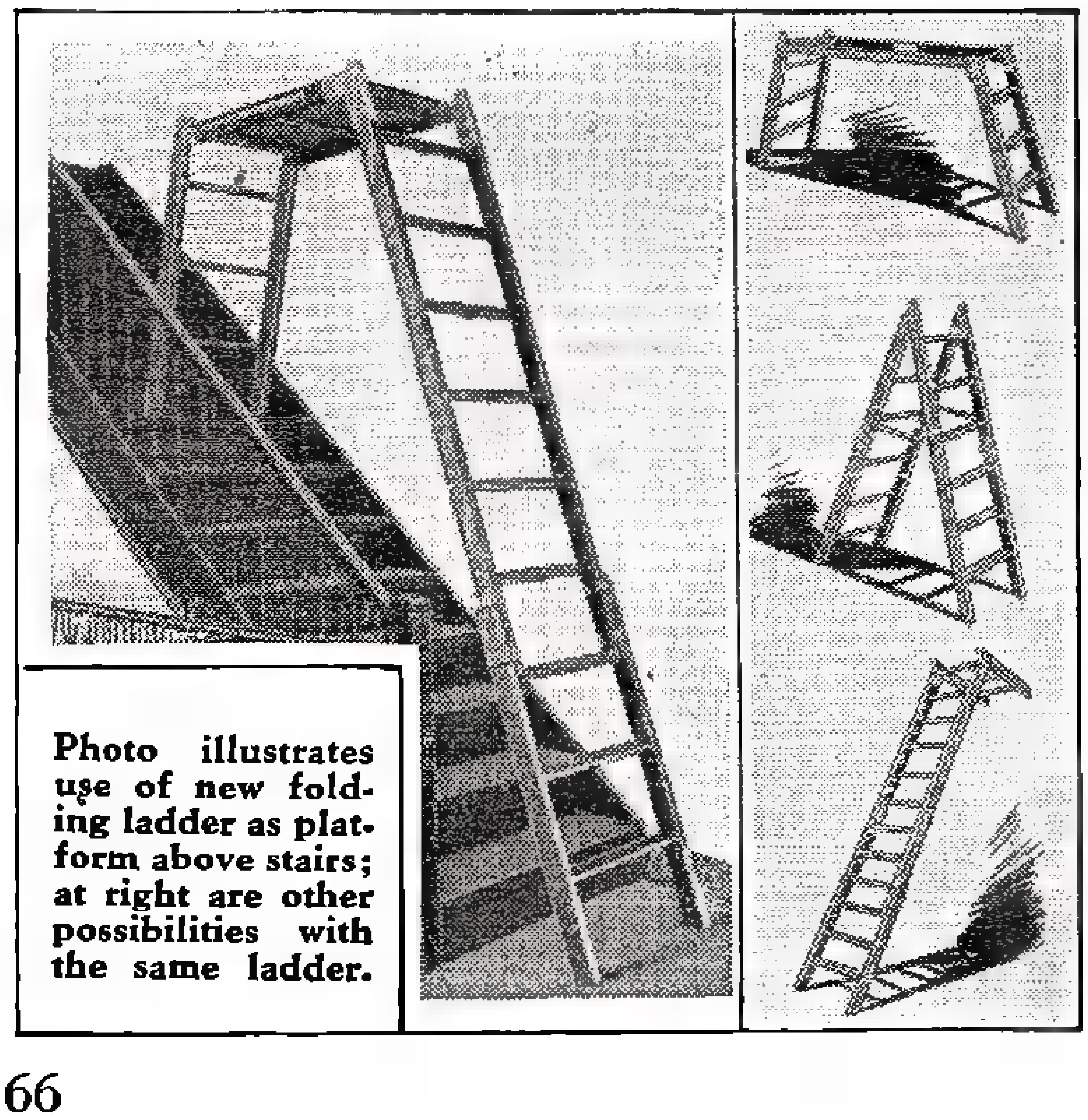


Photo illustrates use of new folding ladder as platform above stairs; at right are other possibilities with the same ladder.

Eye Ailments Cured by Dry Heat

Furnishing dry heat by means of electrically heated water circulating through rubber tubing and eye pads, Elliott treatment apparatus reduces congestion and inflammation of eyes.

EYE inflammations are being successfully treated with dry heat by a new and ingenious apparatus introduced at the annual meeting of the American College of Proctology.

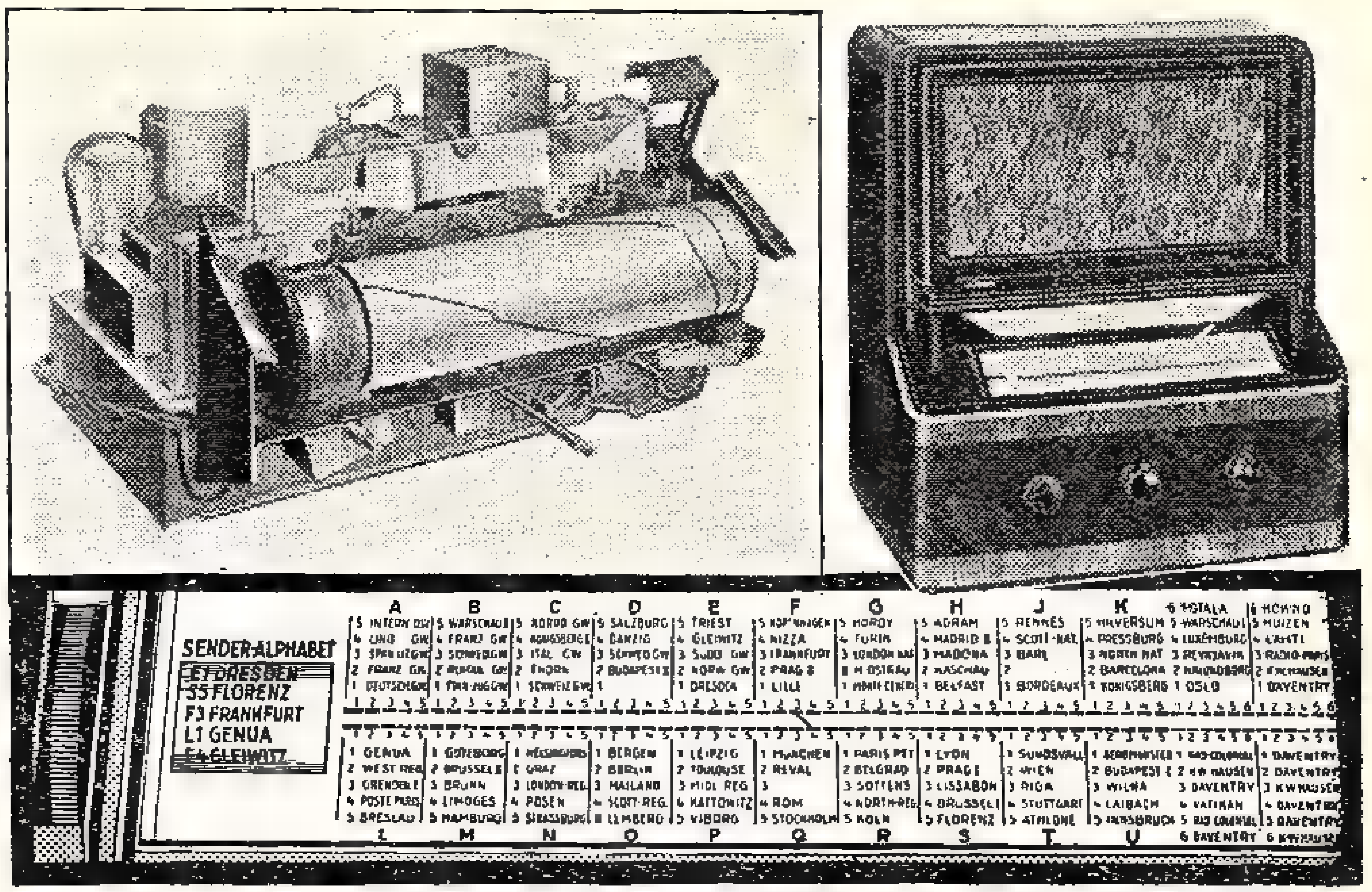
The electric controlling unit automatically heats and circulates water through hollow rubber pads held over the eyes by the patient. The temperature of this water is constantly controlled by the physician.

Tune in by Cities, Not Numbers, on Newest German Radio

AN ALPHABETIC scale of stations on the tuning dial of German's newest radio receiver simplifies the location of programs from any high-powered transmitter in Europe. Wavelengths, frequencies, and dial settings can be forgotten, and even call letters neglected.

A drum type tuning dial to the left of the set has an alphabetical listing of the larger cities in Europe, with a letter and a numeral preceding each name. By turning a second knob, a line scribed on the large tuning cylinder is brought to the specified numeral under the correct letter of the alphabet on the large scale. This automatically sets the tuning condensers to the wavelength of the desired station.

The same tuning system can be used on American radios by re-calibrating and re-lettering the dials.



Top: Chassis of new alphabetically tuned radio, with ultra-modern cabinet at right. Line on cylinder of tuning dial below is set to position by panel knob.

Take-apart Comb Is Easily Cleaned

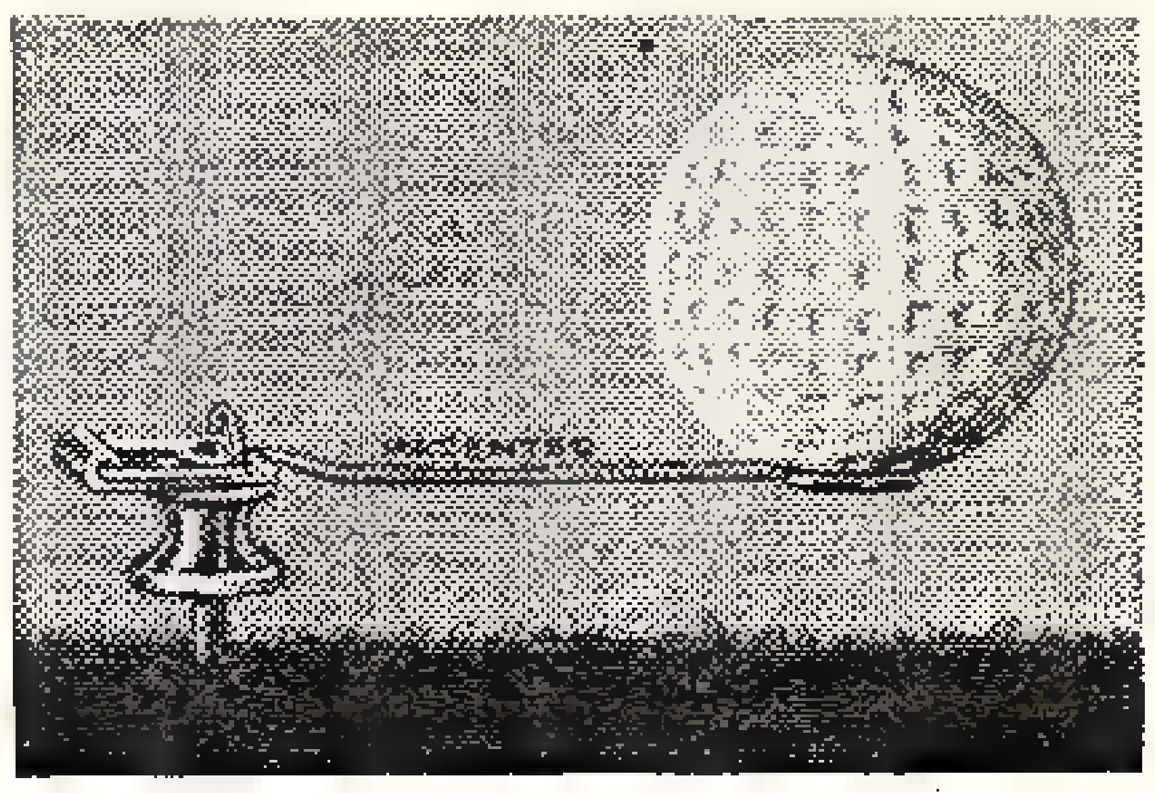
Latest type hair comb is easily taken apart for cleaning.

A COMB which may be taken apart completely by loosening one knurled nut was one of many interesting inventions on display at a National Inventors' Congress recently held in Cincinnati. Broken teeth easily slide out from the grooved frame for replacement.

Newest Golf Tee Spins When Hit

ACCLAIMED by leading golfers to give long, clean drives and to diminish slicing, a new golf tee spins free of the ball when it is struck.

With the tee pushed into the ground, ball is placed on the revolving arm.

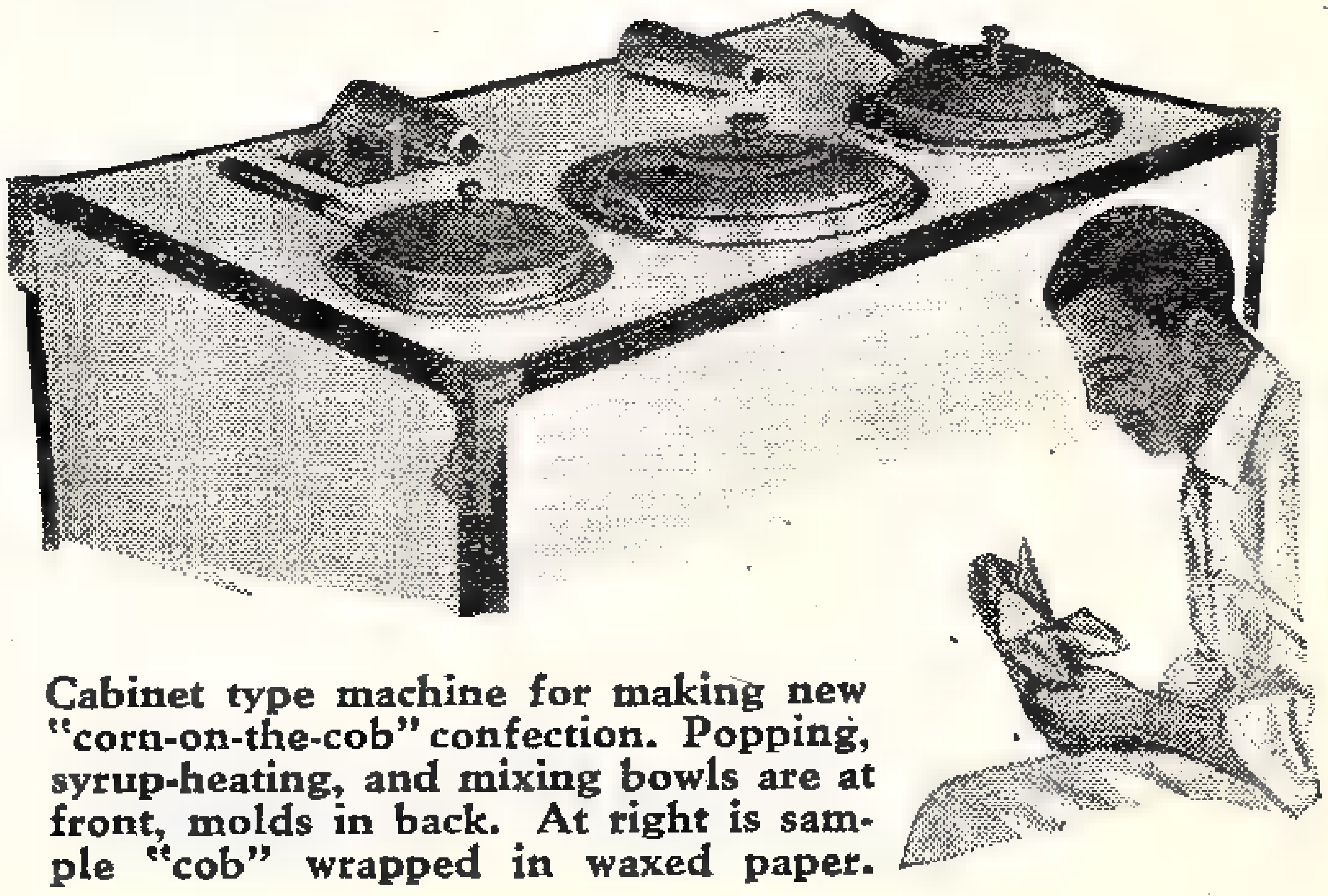


Made of nickel-plated brass, new golf tee spins around when ball is hit, folds flat for carrying.

Buy Your Popcorn "On the Cob"

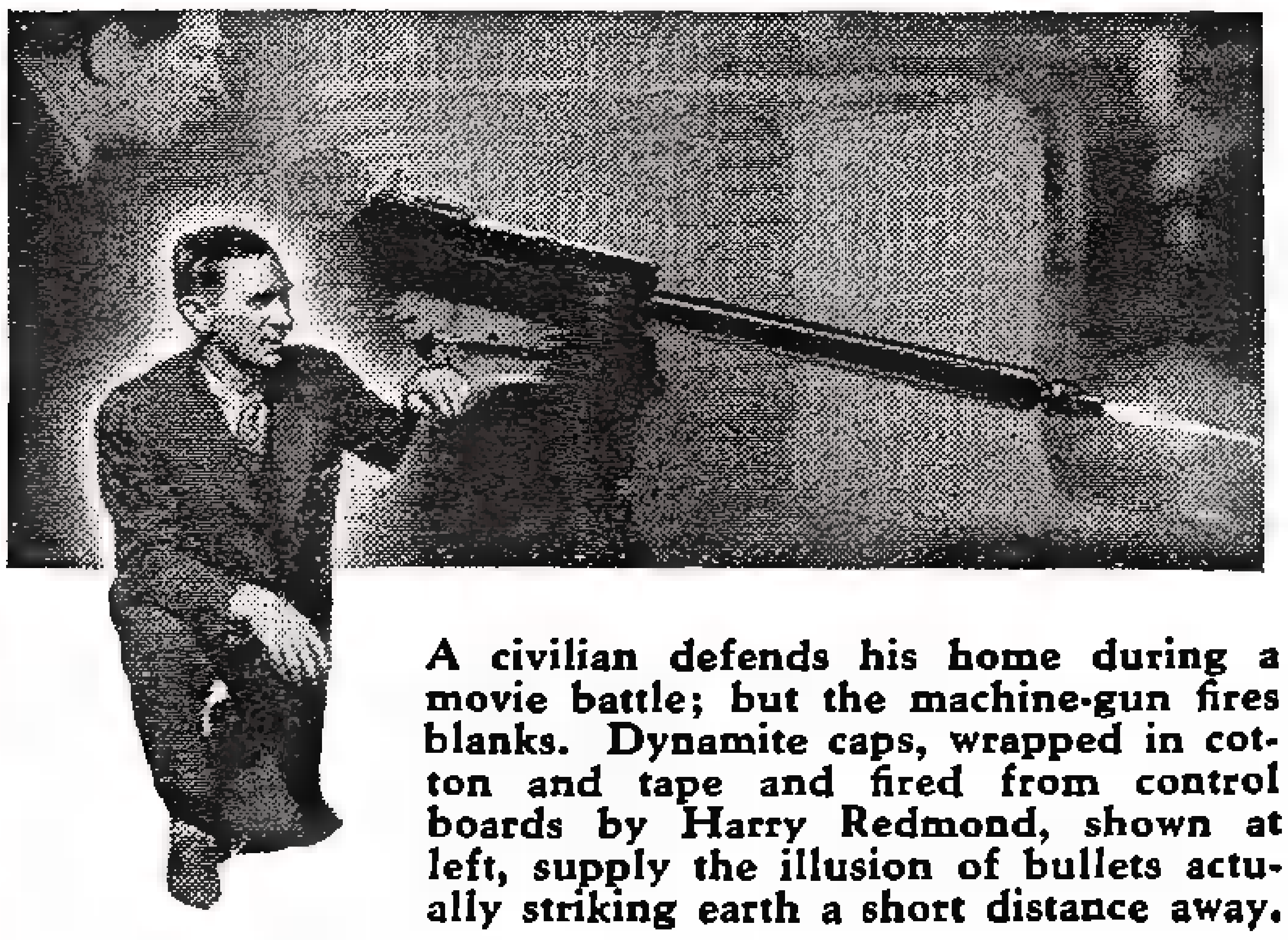
POPCORN now may be purchased by the ear as well as by the bag. The newest of confection machines follows the procedure used in making holiday popcorn balls, but turns out the product in the shape of a cob of corn, wrapped in green waxed paper cut to the shape of corn husks.

After the corn is popped electrically in the usual manner, it is mixed with the syrup and placed in wax-paper lined molds. In a few minutes the cobs are hardened and ready for sale.



Cabinet type machine for making new "corn-on-the-cob" confection. Popping, syrup-heating, and mixing bowls are at front, molds in back. At right is sample "cob" wrapped in waxed paper.

Behind the SCENES on



A civilian defends his home during a movie battle; but the machine-gun fires blanks. Dynamite caps, wrapped in cotton and tape and fired from control boards by Harry Redmond, shown at left, supply the illusion of bullets actually striking earth a short distance away.

A mixture of charcoal and powder, wired to Redmond's control board, provided this thrilling but harmless explosion as movie troops went over the top. Safety is assured the actor-soldiers by construction of the shell pits which are built to expend explosive force upwards.

by HARRY REDMOND

Hollywood Explosives Expert

PUSHING forward across a huge battlefield, 4000 movie soldiers, many of them veterans of World war shell fire, quickened their steps as the earth mushroomed skywards to the explosion of a heavy shell. Machine-gun bullets furrowed the ground at their feet; shrapnel screamed overhead; great geysers of earth were hurled high in the air as the barrage swelled to a thundering climax.

From my firing board beside the cameras, I surveyed the scene with satisfaction. Everything was working out with split-second precision. Suddenly my nerves tensed as a terrific roar tore the very heavens open. Twenty-five large pine trees, previously loaded with dynamite for the effect of shell fire which would tear them from their roots, had exploded ahead of schedule.

Redmond's Biggest Movie Explosion

Unwittingly I had provided the biggest explosion ever set off on land for moving pictures—twenty-five cases of dynamite! I had planned to touch off the trees one at a time, but the concussion proved so powerful that the dynamite went up with a roar, spreading in a few seconds from the middle tree down the line to both ends. Yet so carefully had we notched the trees near their bases that not one man was injured.

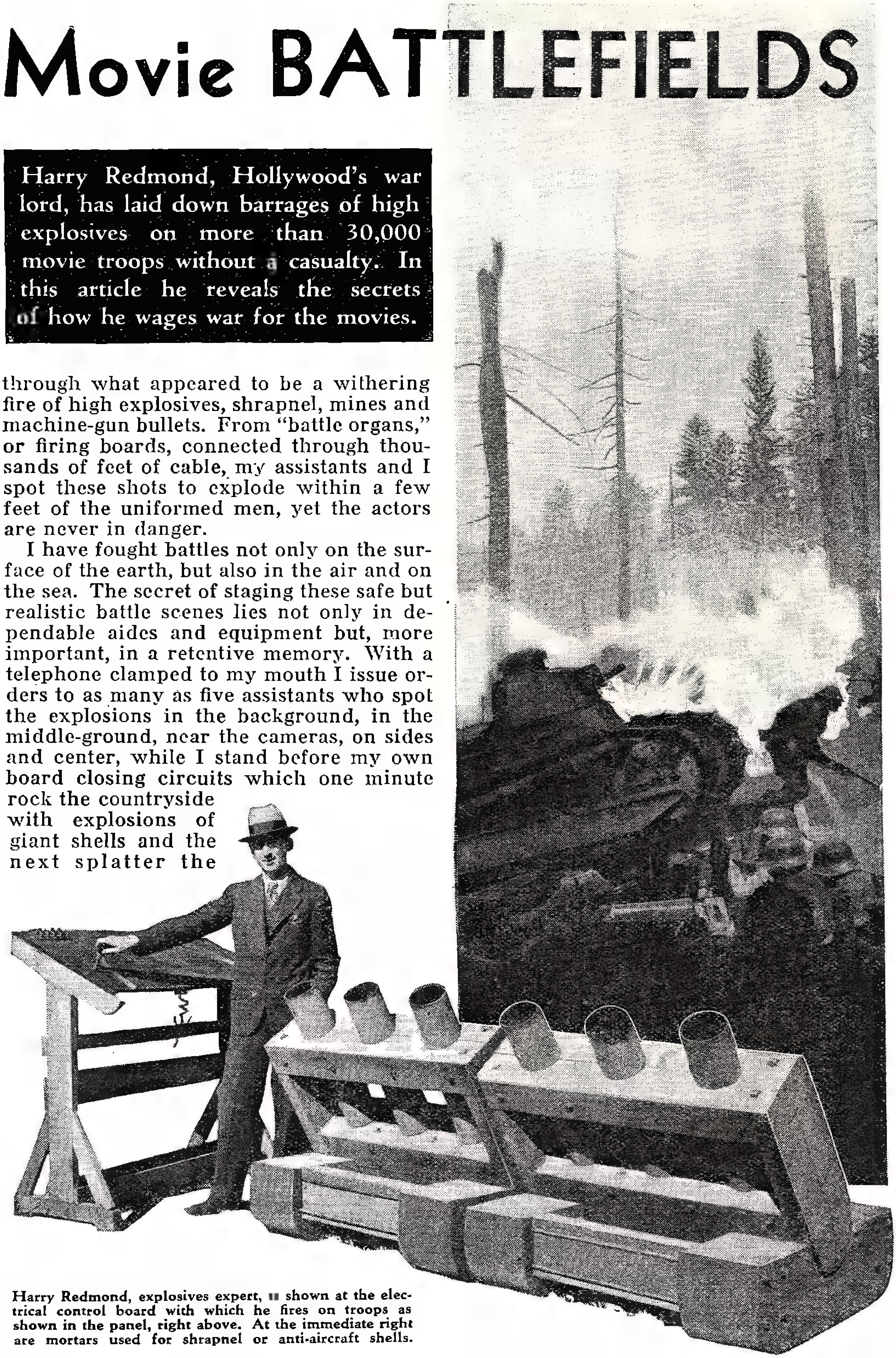
In two decades of providing thrills of a hundred major battles and minor skirmishes for pictures I have fired on fully 30,000 troops without a single casualty. Sometimes only a few hundred men advanced through my barrages, while again the "troops" numbered thousands as they went over the top and marched grimly

Movie BATTLEFIELDS

Harry Redmond, Hollywood's war lord, has laid down barrages of high explosives on more than 30,000 movie troops without a casualty. In this article he reveals the secrets of how he wages war for the movies.

through what appeared to be a withering fire of high explosives, shrapnel, mines and machine-gun bullets. From "battle organs," or firing boards, connected through thousands of feet of cable, my assistants and I spot these shots to explode within a few feet of the uniformed men, yet the actors are never in danger.

I have fought battles not only on the surface of the earth, but also in the air and on the sea. The secret of staging these safe but realistic battle scenes lies not only in dependable aides and equipment but, more important, in a retentive memory. With a telephone clamped to my mouth I issue orders to as many as five assistants who spot the explosions in the background, in the middle-ground, near the cameras, on sides and center, while I stand before my own board closing circuits which one minute rock the countryside with explosions of giant shells and the next splatter the



Harry Redmond, explosives expert, is shown at the electrical control board with which he fires on troops as shown in the panel, right above. At the immediate right are mortars used for shrapnel or anti-aircraft shells.

ground around some lone infantryman with sudden bursts of machine-gun fire.

The entire battlefield is a safety zone for the actors. They may stand within 10 feet of a mine explosion or actually sit on the tiny explosives which represent bullets kicking up dust, without danger. Through long experience I have learned how to produce effects which look destructive to the cameras, yet the only discomfort they ever cause are ringing ears.

Greatest Movie Battle Ever Fought

Possibly no greater movie battle ever will be fought than the big push in "The Patent Leather Kid," which I put on near Camp Lewis, Washington, a few years ago. As I touched contacts on the firing board and gave directions to assistants on the side lines, mines exploded around buildings, tops of trees fell to earth as dynamite tore them loose, whole trees toppled, aerial bombs exploded—a total of more than 15,000 explosions in six minutes.

In that battle alone we exploded 8,000 one-pound bombs made of black powder and magnesium packed in cardboard boxes; 6,000 three- and four-pounders; 1,000 five-pounders, bombs contained within bone-charcoal-filled packing boxes; 500 bombs containing from five to twenty-five sticks of dynamite and 500 using one to five cases of dynamite, besides 27 army tanks and innumerable rifles spitting 50,000 blank cartridges over the field.

The cost alone amounted to a fortune. We spent $47,000 for ammunition, $8,000 for wire, $300 for switchboards, $1800 for mortars and $7,000 for sawdust and charcoal.

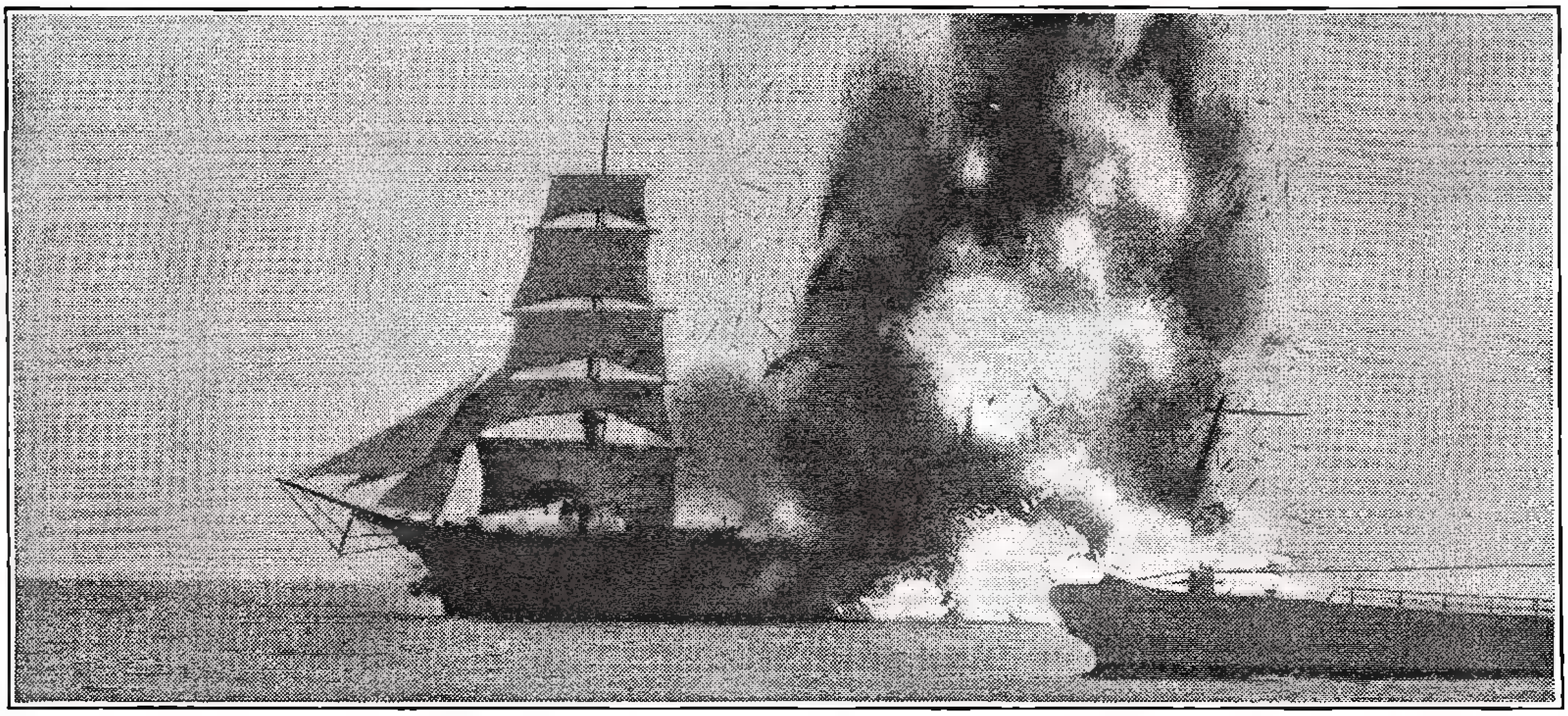
I learned then that only a few men are needed to produce a battle equally as realistic as the genuine article, provided the "war maker" is given time to lay out the field. I always use the "block system," that is, lay out the explosives in squares, each square connected with a particular section of a firing board.

For a typical movie battle, which may cover a field 3,000 feet deep, nine blocks are laid out, requiring as many as five control panels to handle the thousands of explosives. I mount one beside the main cameras on a platform 10 feet high, from which I can observe the entire field. Another is located beside me, a third on the other side of the cameras for firing the machine-gun bullets, while the fourth and fifth are stationed some 2,000 feet distant, just outside the camera line. These fire the larger background pieces, cutting down trees and exploding mines as I direct.

Making No-Man's Land Safe

Spectacular and realistic as a battle may appear on the screen, we really take no chances, even though the soldiers may move in three waves exactly as if they were engaged in actual battle. Infantrymen fall individually and in groups, not because of injuries but because they are told to drop at those particular spots. I watch them carefully, exploding shells behind them or firing shrapnel over their heads from home-made mortars stationed on both flanks.

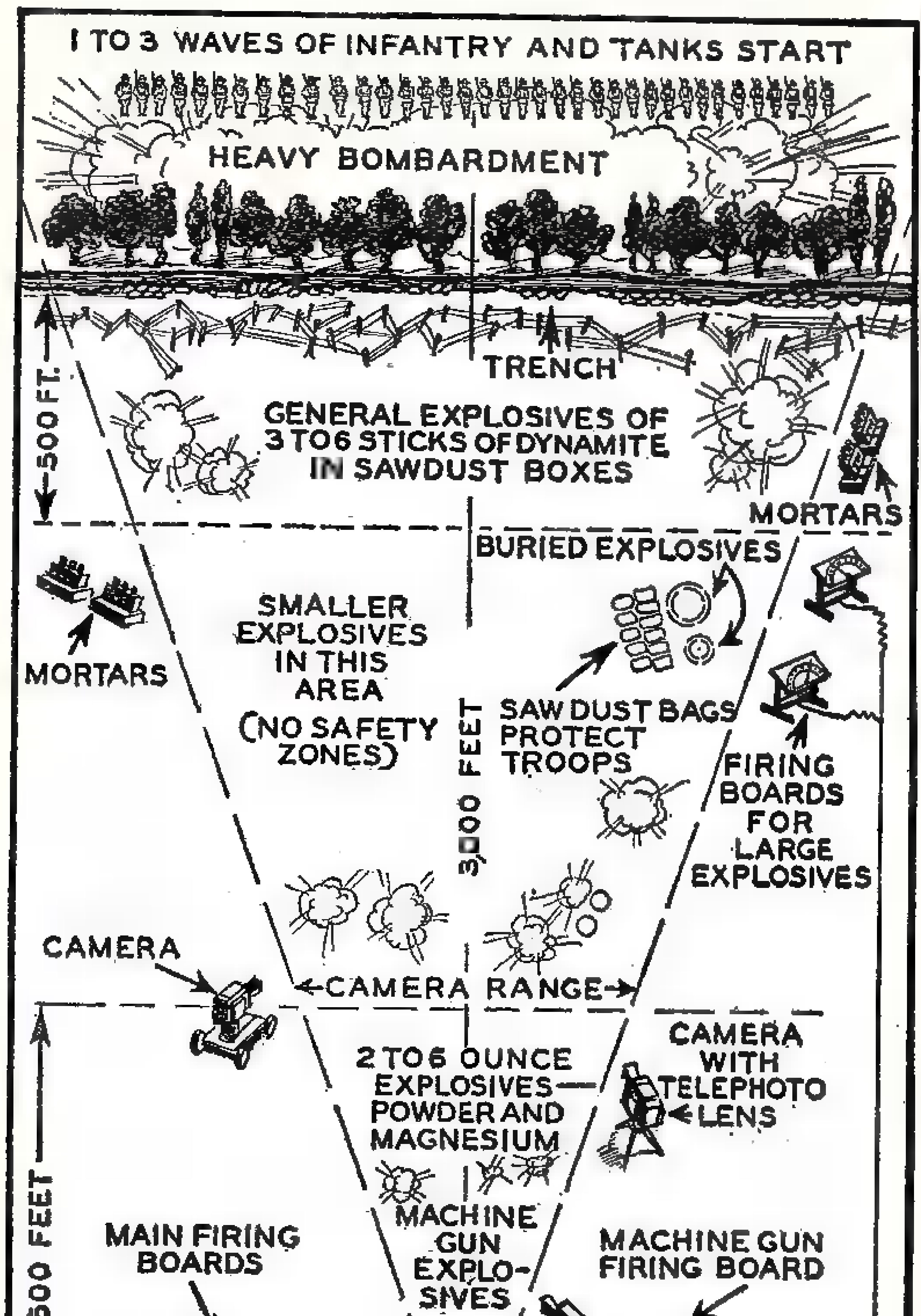
Obviously, we cannot rehearse a battle scene, except to move the troops across the field to time their march. Ammunition costs too much. For that reason I cannot fire on a time schedule. I must watch every soldier and "kill" him from memory. I stay as close as I can to the advancing lines, usually sending up explosives behind them to help "frame" the picture. If a tank comes



Redmond's biggest movie thrill came when six hundred pounds of dynamite which he had planted aboard this old ship exploded prematurely, fired by a shell from the submarine as he was pulling away from the scene in a small boat.

Movie Artillerymen Fire Paper Shells Over Hollywood No-Man's Land

Bearing all the grim aspects of reality, this shell-torn waste is really a synthetic battlefield near Los Angeles.



1 TO 3 WAVES OF INFANTRY AND TANKS START
HEAVY BOMBARDMENT
TRENCH
500 FT.
GENERAL EXPLOSIVES OF 3 TO 6 STICKS OF DYNAMITE IN SAWDUST BOXES
MORTARS
BURIED EXPLOSIVES
MORTARS
SMALLER EXPLOSIVES IN THIS AREA (NO SAFETY ZONES)
SAWDUST BAGS PROTECT TROOPS
3,000 FEET
FIRING BOARDS FOR LARGE EXPLOSIVES
CAMERA
←CAMERA RANGE→
2 TO 6 OUNCE EXPLOSIVES—POWDER AND MAGNESIUM
CAMERA WITH TELEPHOTO LENS
500 FEET
MAIN FIRING BOARDS
MACHINE GUN EXPLOSIVES
MACHINE GUN FIRING BOARD
REDMOND
TROOPS REACH HERE IN 6 MIN.
CAMERAS
TELEPHONE LINE CONNECTING FIRING BOARDS

Diagram above shows how field is laid out for a movie battle. Note firing boards which control various explosions. There are no "safety zones" for the actors, since all explosives are fired individually, not on time schedule. Sawdust bags protect men from "mines" and "shellfire." Craters where explosives are buried are likewise constructed so that force of blast will mushroom skywards.

Not German artillerymen, but Hollywood actors. The shells are cardboard, used against airplanes. Planted explosions "destroy" the ground troops a moment later.

through I touch off an explosion directly underneath its belly. This is neither difficult nor dangerous, first because I can see the discoloration in the earth where the charge has been planted and second because the powder or dynamite charge is small and covered with loose charcoal. Sometimes we actually paint the earth black or gray in order to have a contrasting "spot" which may be easily seen.

I guarantee safety to the make-believe soldiers both by making sure the explosions will mushroom toward the sky when I hit the switch and by the way they are placed in the ground.

The larger explosives are made of dynamite or powder. To get the effect of a shell cutting down a tree, for instance, my assistants cut a deep "V" notch around the trunk. The dynamite sticks are packed in the trunk, with at least two caps buried in the dynamite to prevent mis-fire. On exploding, the tree is lifted straight up in the air, to fall in whatever direction it chooses, usually with the wind.

(Continued on page 120)

Sheriff Builds Pivot-Winged Plane Which Fits in Garage

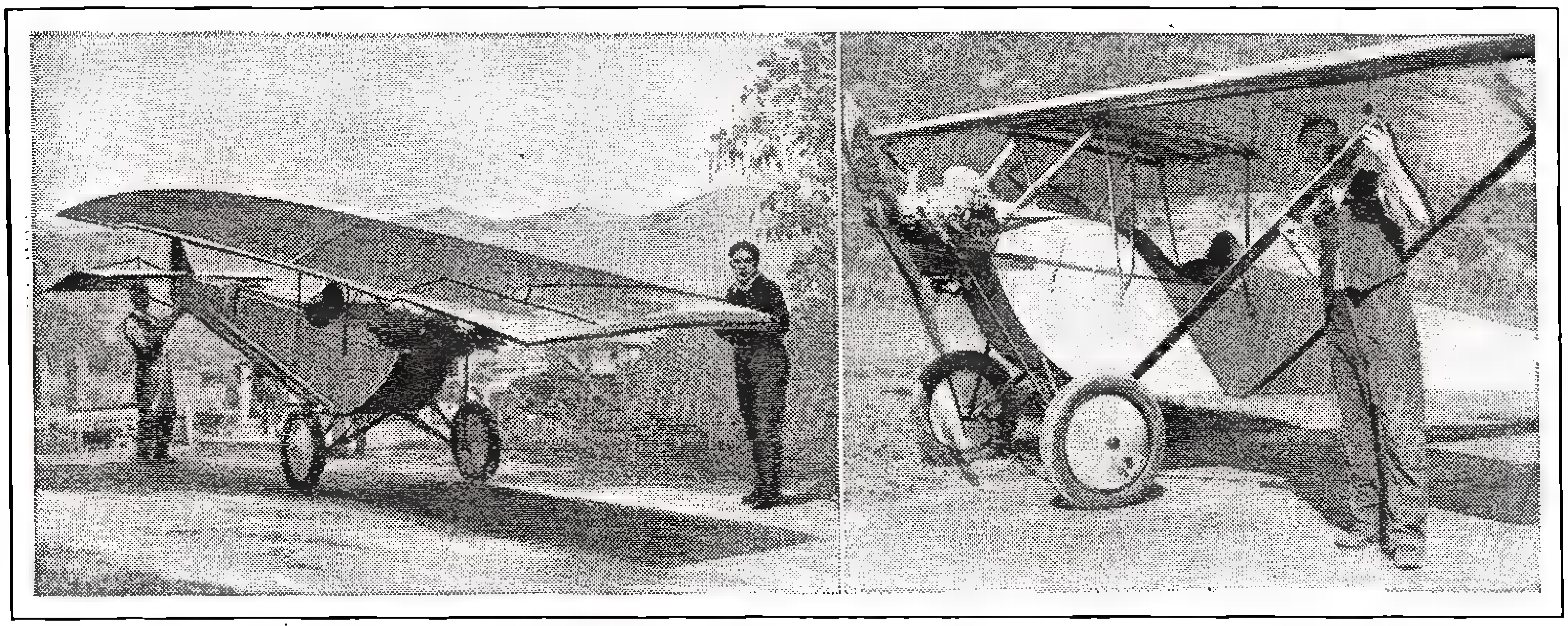


Photo left shows how wing of home-built monoplane pivots at point above cockpit, thus lying parallel with fuselage and permitting storage in narrow garage. Right—Sheriff Sellmer, the inventor, bolts strut in place ready for takeoff.

ONE of the most novel light planes ever constructed by a home craftsman is the pivot-winged craft which was recently completed by Sheriff Jacob P. Sellmer, of Marin county, California.

The ship follows conventional lines for light monoplane design and is apparently braced in the customary manner. Sellmer's plane, however, has struts which may be quickly unbolted to permit pivoting of the entire wing.

By means of this unusual feature, the wing is swung around directly parallel to the fuselage, with its ends projecting over the nose and tail assembly. Thus the ship is easily stored in a narrow garage and may be transported easily on the highway.

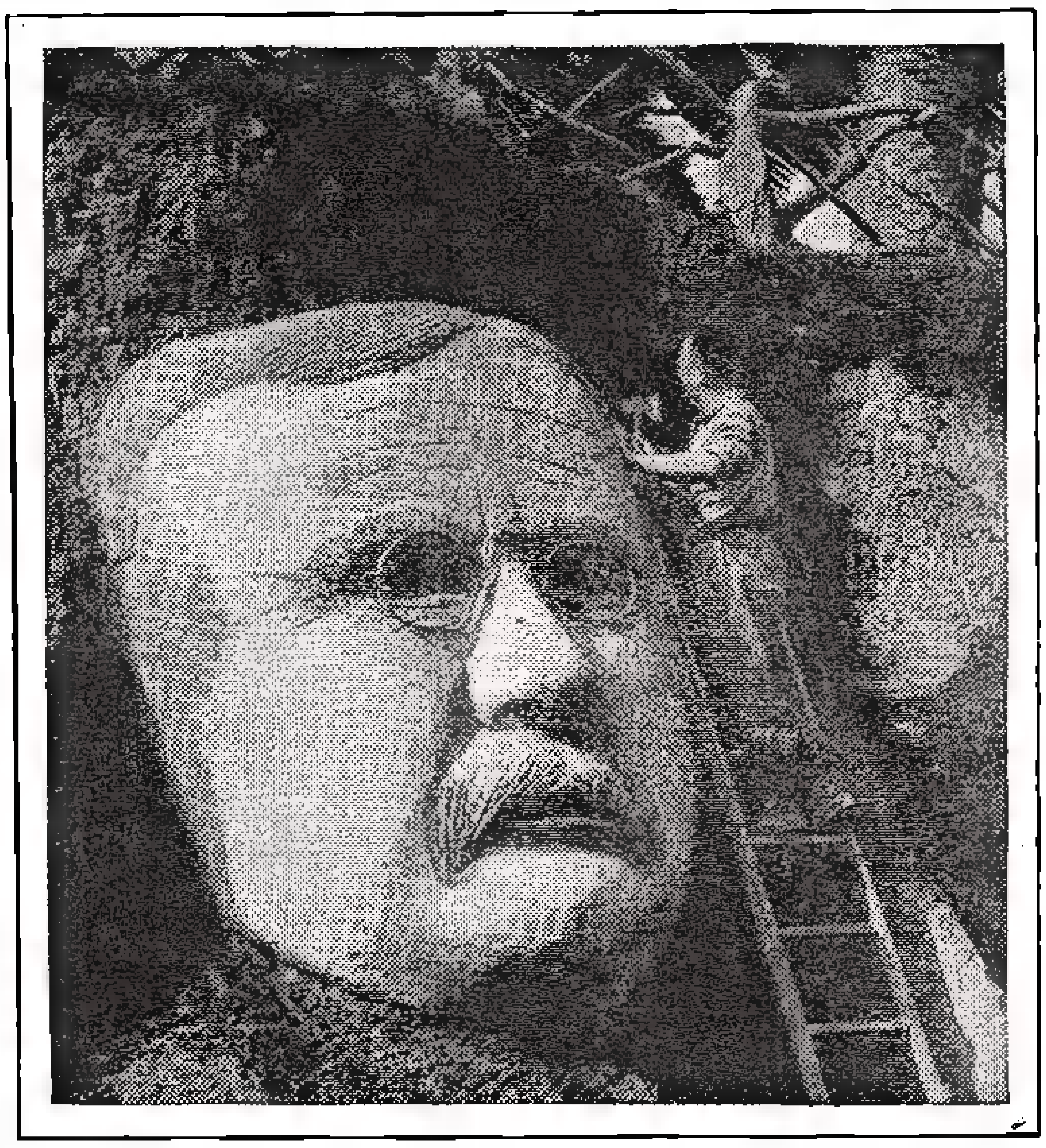
Sellmer, who is a fish and game warden, uses the ship extensively to patrol his district. The novel craft was conceived and built solely through Sellmer's efforts and required about four years to perfect.

Artist Designs Novel "Gallery"

THE features of America's presidents will be preserved for posterity in a novel "art gallery," if officials of Santa Monica, Calif., approve the plan of a local artist.

Fritz Henkels, sponsor of the idea, is a general contractor by trade and an outdoor artist by preference. He proposes to fashion a series of presidential heads which will jut out in bold relief from the cliff below Roosevelt road, Santa Monica.

Henkels has already completed an amazingly life-like head of Theodore Roosevelt. The preliminary work is done in clay and is then coated with a facing of cement which acts as a preservative against the elements.



This huge head of the late Theodore Roosevelt is the first of a series of presidential likenesses planned by Fritz Henkels, a Santa Monica artist, as a cliff-side decoration.

Auto-Slingshot Loads Via Handle

ONCE a small boy's toy made of rubber bands and a convenient Y-shaped stick, the slingshot has advanced to the status of a minor weapon with the introduction of a shot chamber, or magazine, in the handle which makes the device a repeater.

As fast as one pellet is sent spinning through the air, another may be picked from the end of the magazine with the leather shot holder. The device is said to be accurate and delivers air rifle results.

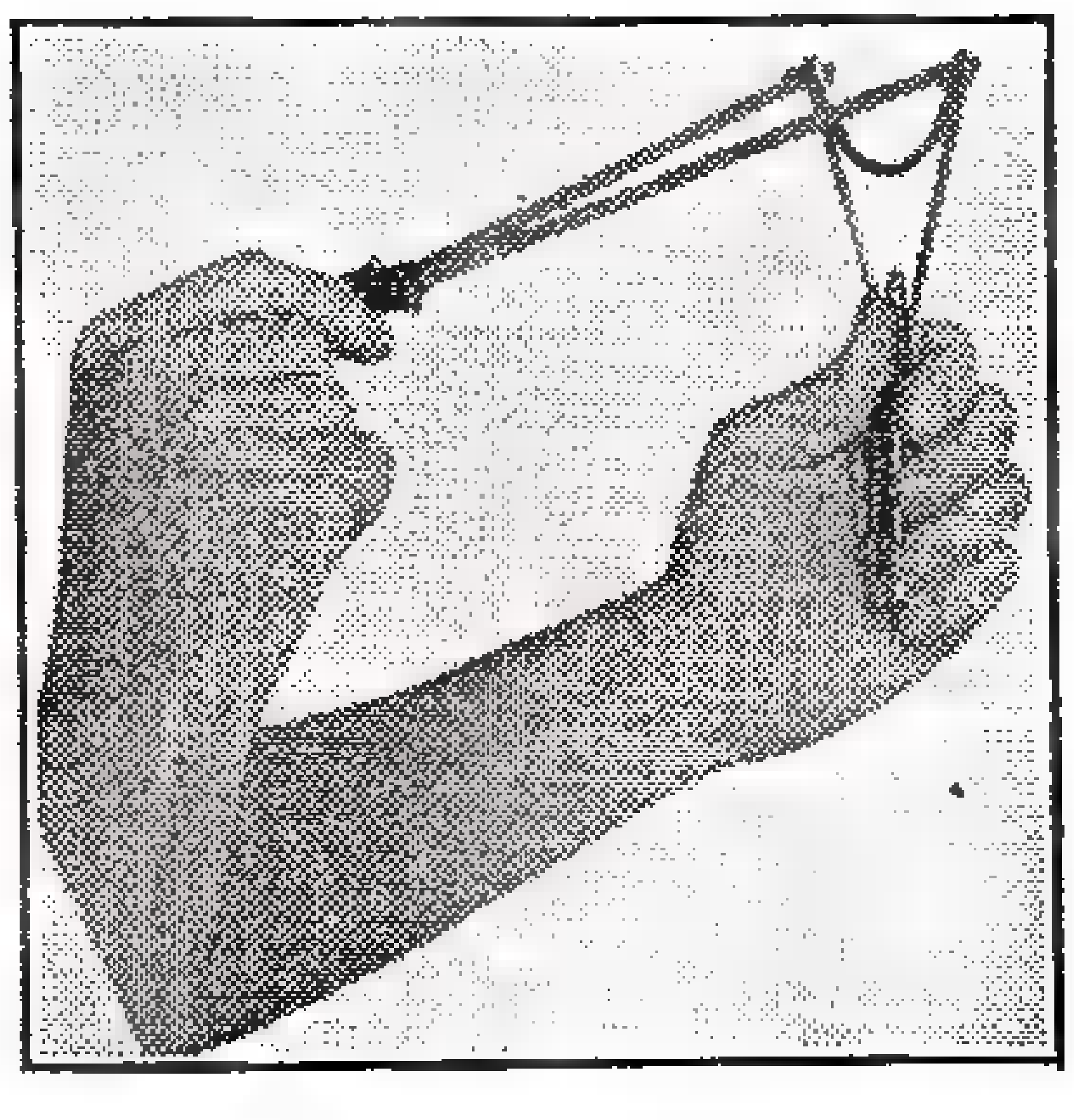


Photo shows repeating slingshot. Pellets are fed to shot holder from chamber in handle.

UNDERGROUND CANNON BLASTS THROUGH STEEL AND CONCRETE TO BRING IN OIL GUSHERS

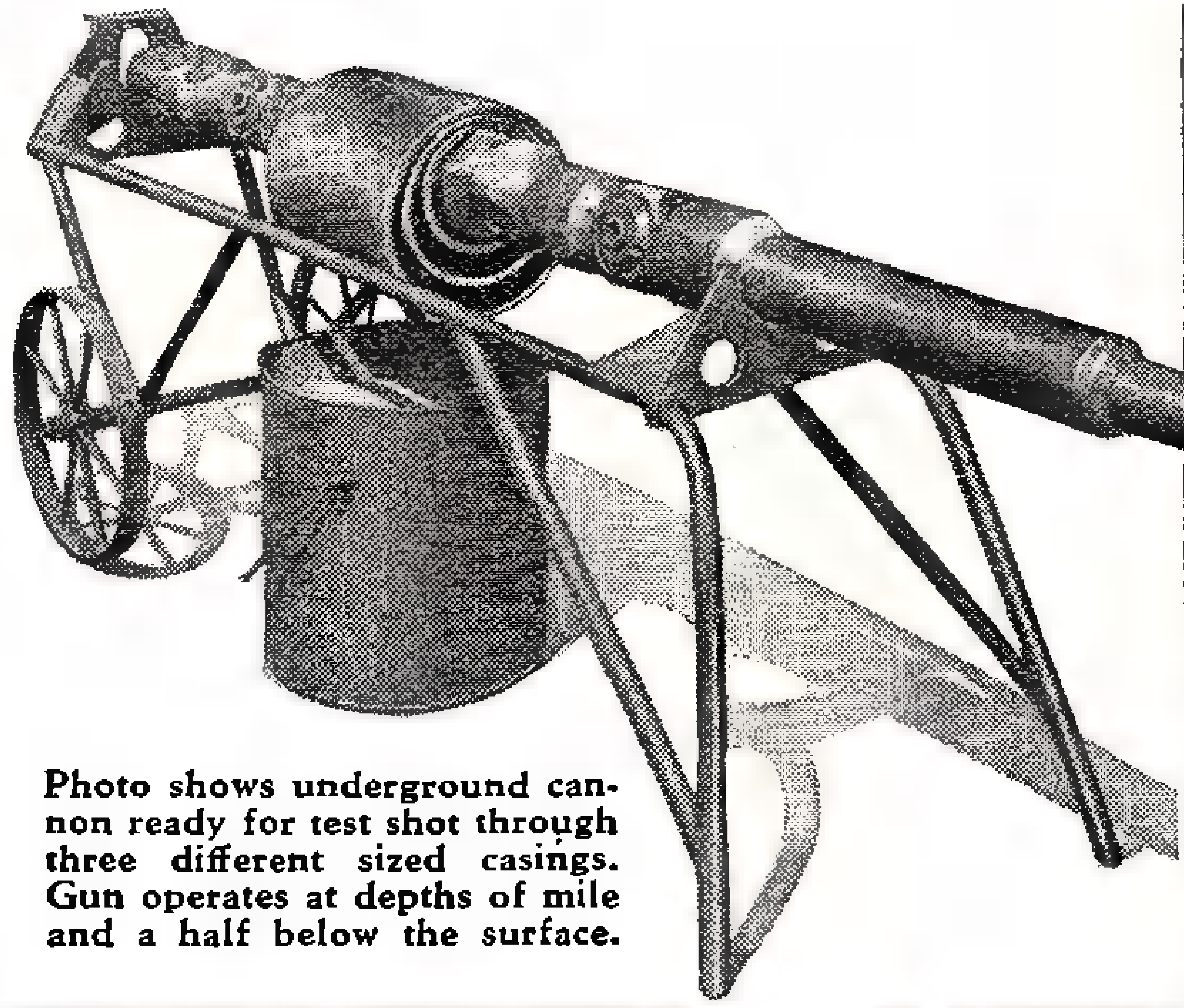
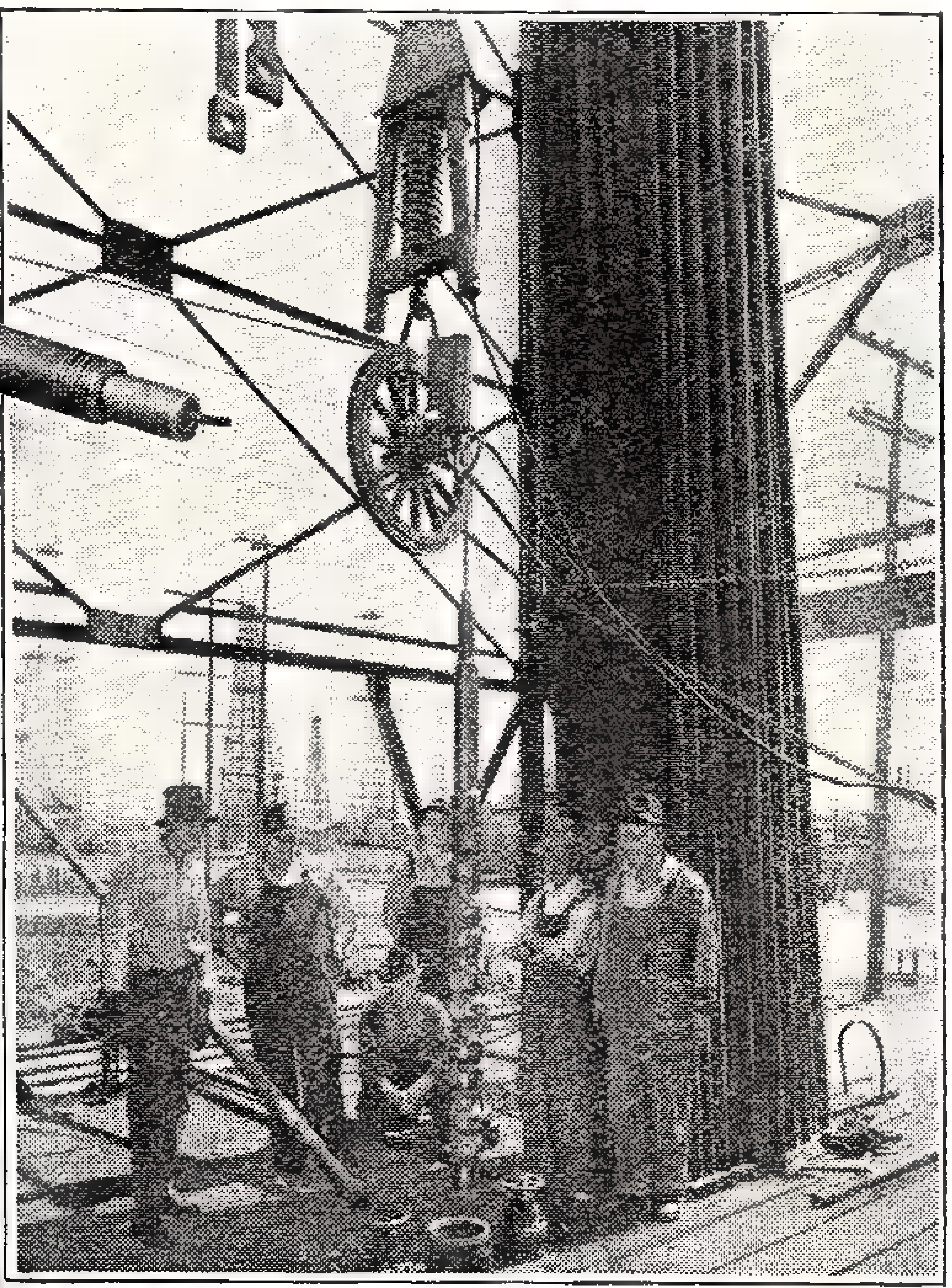
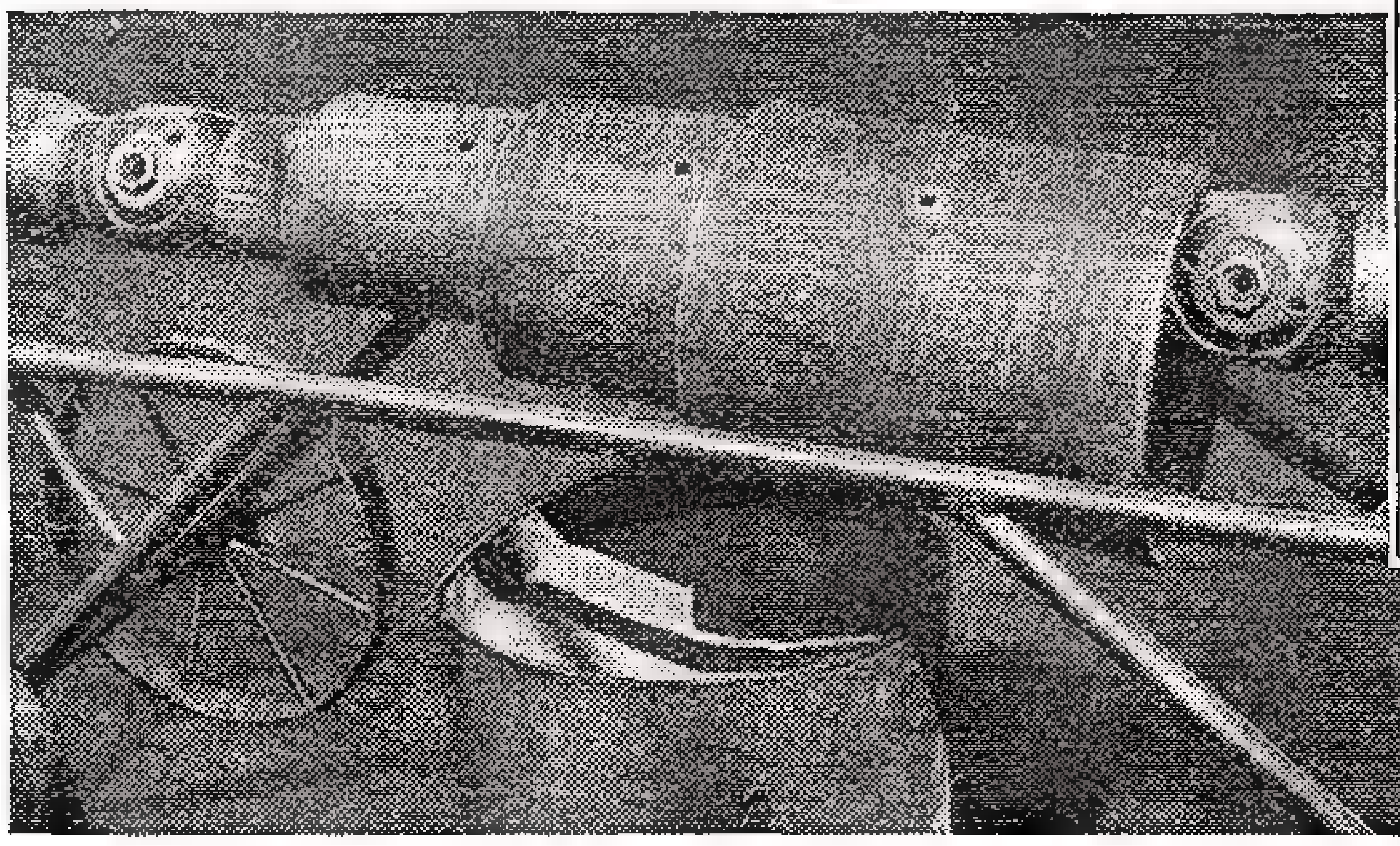


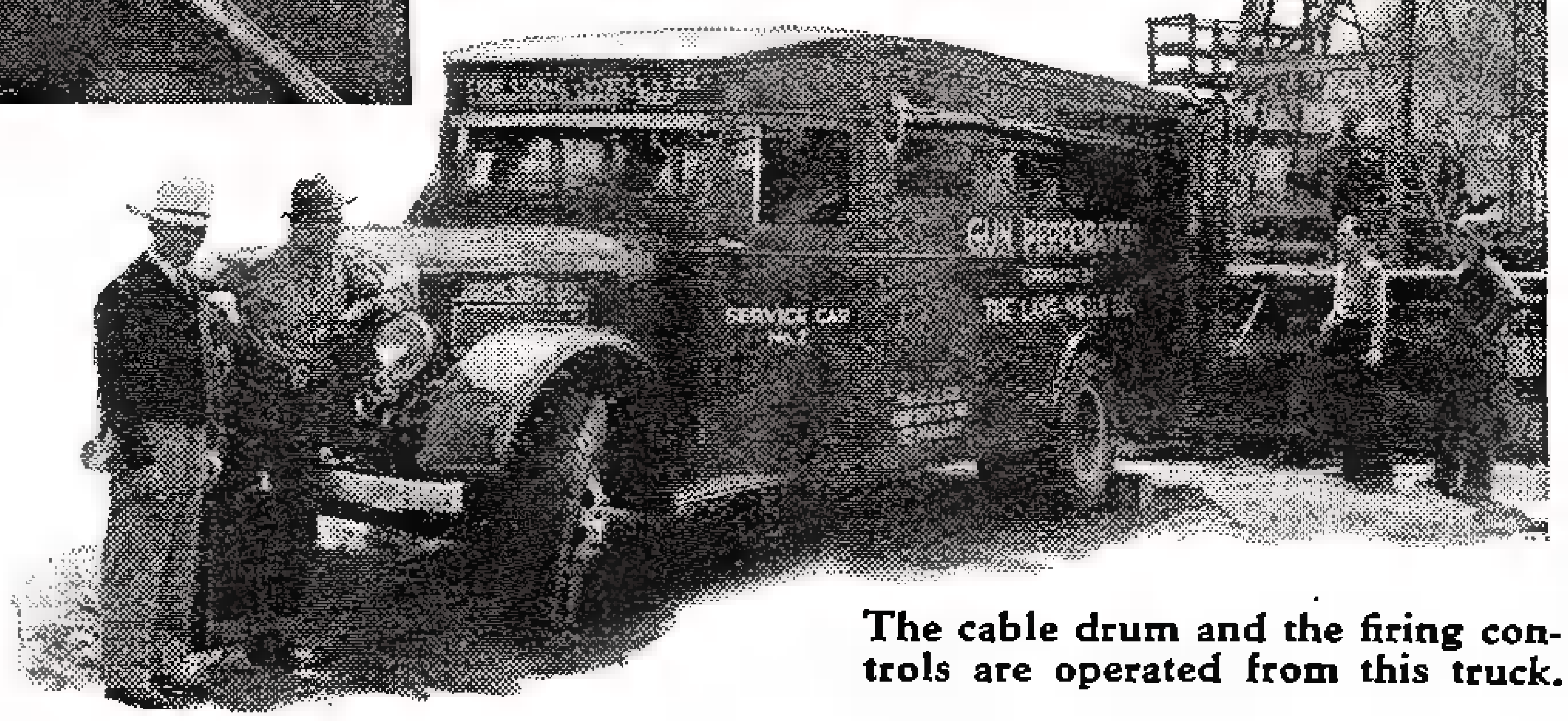
Photo shows underground cannon ready for test shot through three different sized casings. Gun operates at depths of mile and a half below the surface.



A derrick crew lowers gun into hole. Firing controls are in the suspension cable.



Result of the test shot, above, is plainly shown in perforated casings. Note gun's firing chambers on either side of casings.



The cable drum and the firing controls are operated from this truck.

OPERATING at more than a mile below the earth's surface, an electrical depth gun fires forty-five caliber bullets through thicknesses of steel and concrete oil well casing to open up strata of oil-bearing sands which may have been passed in the original running of the casing.

In sinking an oil well, the steel and concrete casing may penetrate and pass oil-bearing strata with potential production capacity. When it is considered advisable to open up any of these strata the underground cannon is lowered into the casing and fired at the desired point.

The cannon is simply a long steel tube with from eight to fifteen firing chambers, spaced about six inches apart. These firing chambers are "spiraled" so that no two perforations are made in the same direction.

The problem of firing the gun through the liquid muck with which every oil well hole is filled was solved by an ingenious system of electrical controls. Through the center of the lowering cable is an electrical wire which makes a contact with the base of each cartridge. These may be fired individually, since each chamber has a separate wire inside the gun. A dial which has a contact point for each of the cartridges is rotated by a magnetic spring ratchet, firing the gun on the principle of an automobile distributor.

The bullets are cased in water-tight steel and are pointed for maximum penetration. Retarded firing, developing pressures above 180,000 pounds per square inch, provides power that will send the bullet through 1½ inches of boiler plate. The gun is raised between shots to space the perforations.

Finding Your Way When LOST

BIG game hunters often must go miles away from civilization as they tramp through the woods and hills seeking deer, moose, and other game. When snow obliterates trails and game leads hunters far off the beaten paths, there is a constant danger of becoming lost.

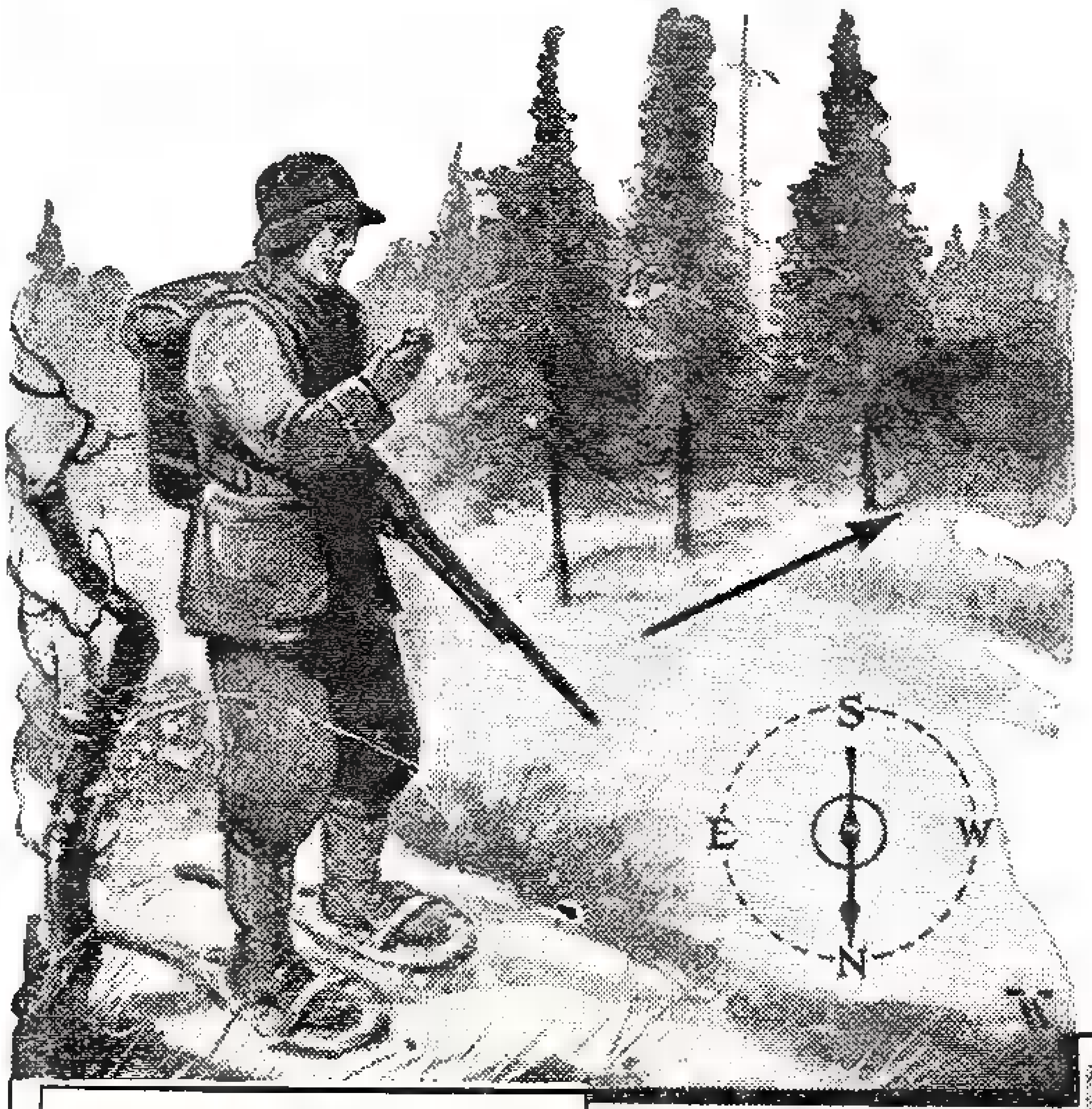
Becoming lost is not as terrible an experience as it may seem if the hunter knows a few simple rules that will help in finding the way back to camp. The big danger of getting lost in the woods is becoming panic stricken. So great is this danger that a few helpful hints on finding one's way through the woods will be given before going into a general discussion on guns and tips on hunting such game as deer, moose, and mountain sheep.

As a precaution against becoming lost carry a good map of the region in which you are hunting. Make this accessory as necessary to your equipment as your gun. If possible, get a detailed county map. Topographical sectional maps are obtainable from the government for some parts of the country. Study the map, noting the physical nature, lakes, heights and streams of the region. A large lake may be the center of the immediate region. If you get lost you can climb the tallest tree near you and at once locate the lake. A railroad running through the region is a certain means of finding your way out. Knowing if it runs east and west or north and south your compass will then tell you which way to go.

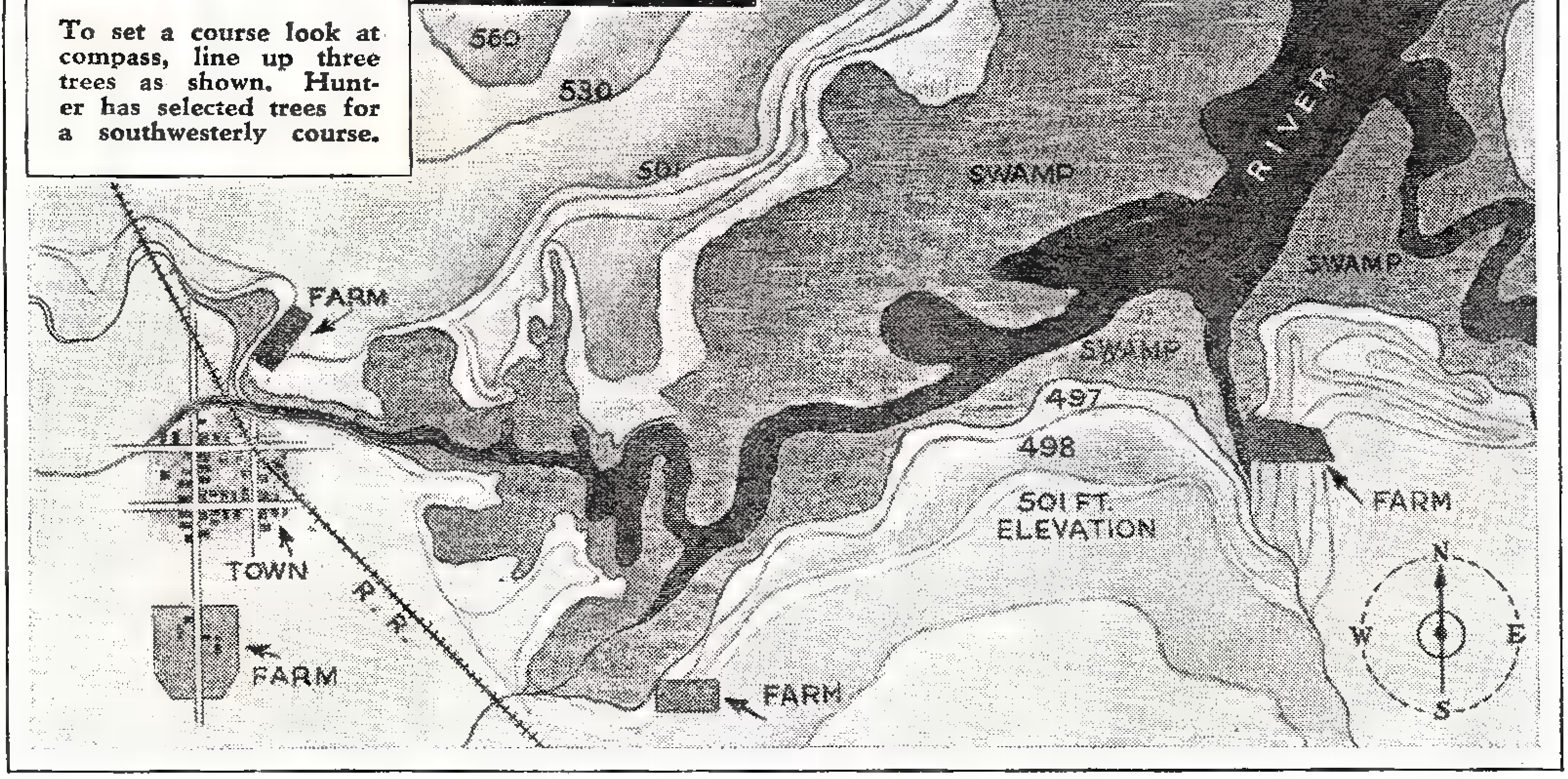
Snow Is Both Aid and Enemy

When there is snow on the ground, quite often you can follow your own foot prints back to camp. If there is no snow or if it has been snowing steadily while you have been in the woods, it will be difficult to trace your way back. Trails in the woods can not be relied upon, as they lead in all directions. Main trails, however, lead to definite places, and can be followed. In the north woods, if your compass shows that a main trail runs north and south, you can be fairly certain of finding some form of civilization by taking the trail to the south.

Get in the habit, when off the beaten



To set a course look at compass, line up three trees as shown. Hunter has selected trees for a southwesterly course.



A topographical map is very valuable in the woods. If lost, hunter has several landmarks on above map to get bearings, such as the river, 560-foot hill, and railroad. By climbing tree he should be able to see at least one of these landmarks.

in the WOODS

track, of walking in a straight line, which is readily done by lining up with trees ahead of you. By keeping three or four trees in view it is an easy matter to keep a general straight line. Unless this is done, one is likely to walk in a circle, the common habit in the woods when lost. Trust your compass. If it says North, then believe it.

As soon as you realize you are lost, stop right where you are and take stock of the situation. If possible climb the tallest tree around you and look the country over. Without doubt you will observe some familiar landmark to guide you. If you decide to walk, break twigs as you go. You can then follow the broken twigs back to where you were if necessary.

Fire Your Rifle to Indicate Position

If lost, and night comes on, fire your rifle, first two shots, rapid, then one after a little space of time. Listen for answering shots. Keep a fire going and in the day time make a smudge out of it so that the smoke will mount high into the air. Smoke is easily seen in the woods and will be marked for miles in the clear, frosty air.

It is a good idea to carry a .22 caliber pistol when hunting in the woods. With it you can kill small game if necessary. A small pocket cooking kit and a waterproof match case are also valuable and can easily be carried in the hunter's coat.

Hunting deer and other big game found in North America is one of the most thrilling of outdoor sports within reach of the average man. In big game hunting the hunter is seeking a quarry more his equal in size. The game is swift of foot and very elusive. It is a sport matching the wits of an animal against the intelligence of man.

Deer hunting is the most popular of big game sports. Although thousands are killed every year, deer continues to be plentiful. In some states, where alternate hunting seasons prevail, the number is increasing.

Careless Hunters Increase Hazards

As a result deer hunting has become a sport within reach of all. Thousands who have a car and gasoline, go into the woods hunting. Consequently the skilled and careful hunter is thrown in with the careless and unpractised person. That accounts for many accidents due to deer hunting.

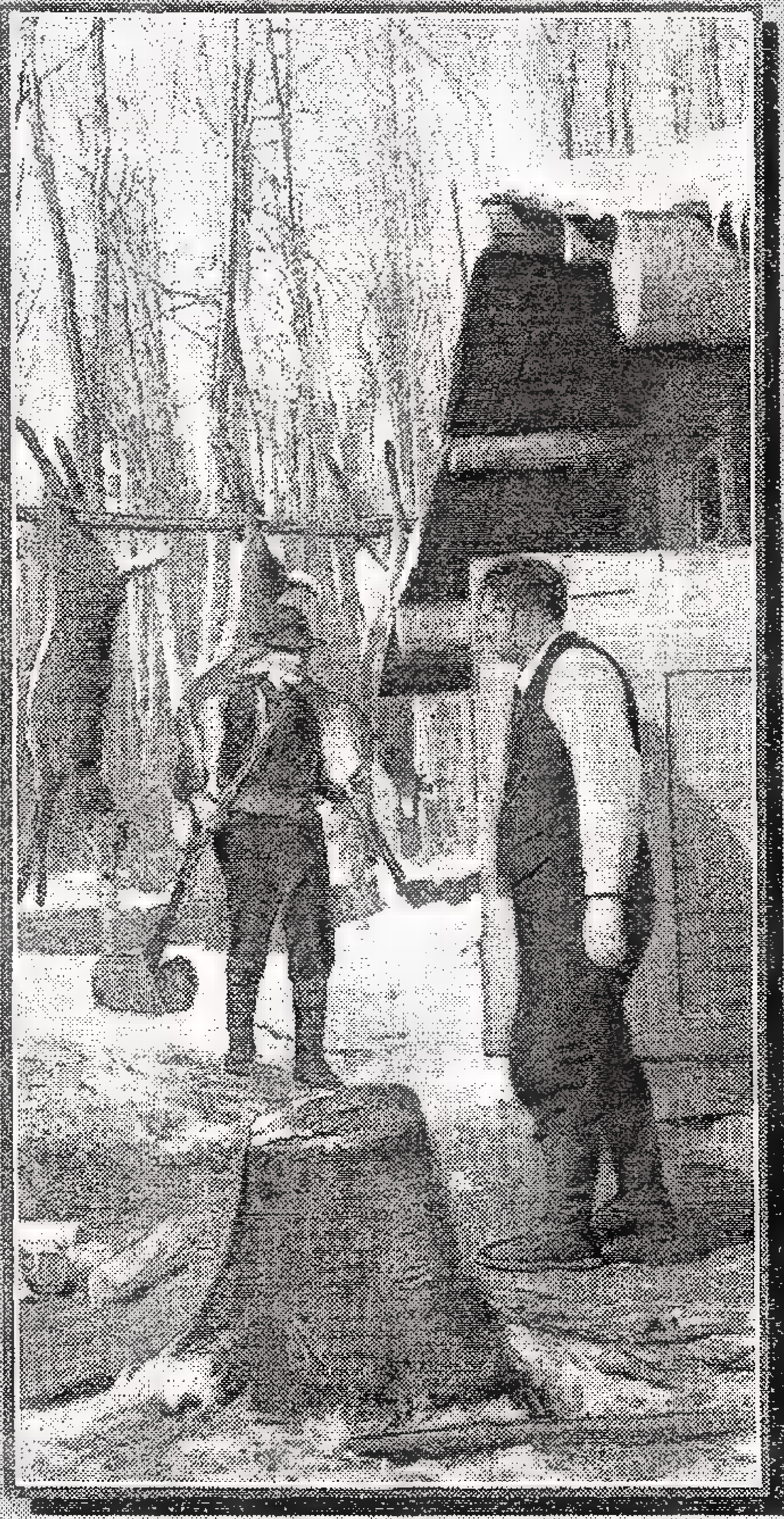
You can help the sport by observing a few simple rules in the woods. Do not fire carelessly in the direction of any noise you hear. Be sure that you see the deer before you fire. It takes only a fraction of a second before shooting for the eye to take in an area ahead of the gun to be certain that

SPORTSMEN'S CAMPFIRE

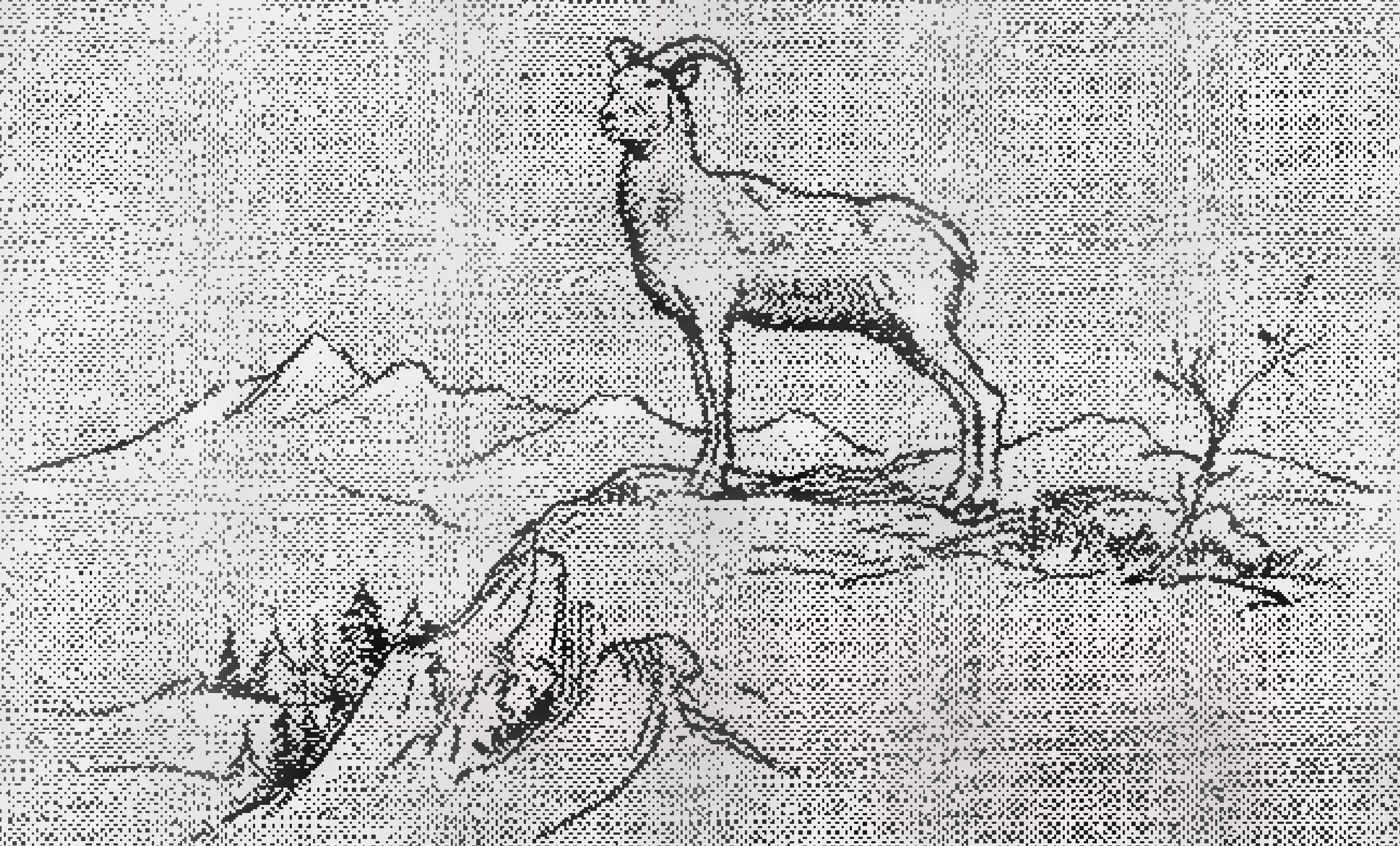
by

ROBERT PAGE LINCOLN

Adventure and a test of hunting ability await the big game hunter. Here are helpful tips on hunting deer, moose, and mountain sheep.



Returning to his cabin this hunter has the thrill of recounting his adventures in bringing down the deer.



SPORTSMEN'S

Stalking Deer Tests Hunter's Skill and Cunning

no human being is in line of fire. When crawling over fences or other obstructions, be very careful of your gun. Thrust it carefully ahead of you and keep the muzzle pointing toward the ground, not toward the man who has preceded you.

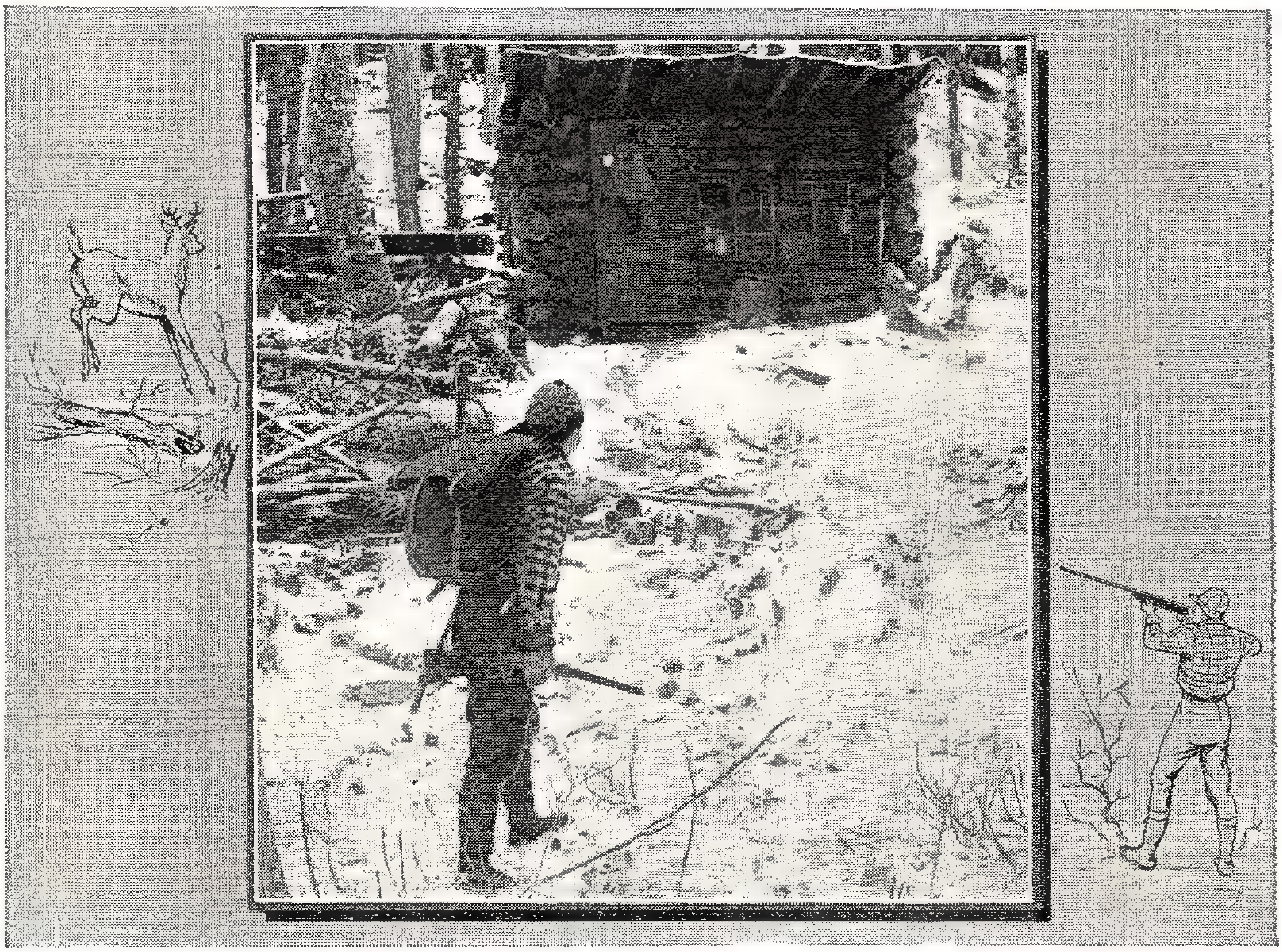
Medium-power rifles, such as the .25-20 and the .32-20 are not recommended for deer hunting. Better rifles are the .30-40 Krag, the .250-3000 Savage, the .30-06 Springfield, and of course the common everyday .30-30 so well known to hunters the length and breadth of the land. An open-point, expanding, high-velocity bullet is best for deer and other big game. It has the power and the shock to kill.

Hunting is best after a snow fall. When there is a good tracking snow the possibility of obtaining a shot is increased many fold. Added to this, the snow deadens the sound of one's walk over the leaves.

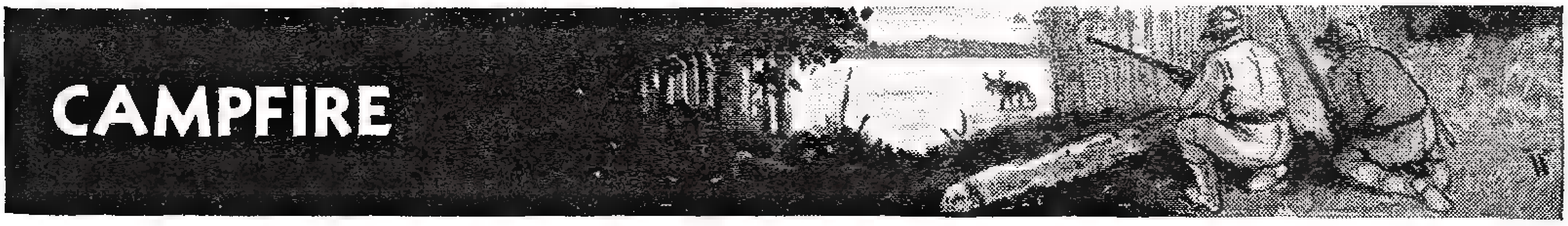
When no snow is on the ground the drive method is often used. Certain hunters of the party station themselves at commanding points while other members of the party drive toward them. Generally the deer will break into the open. The wind being toward the hunters posted on guard the deer does not draw scent of them, but does scent the drivers. Naturally they attempt to evade the drivers by running in the opposite direction. This method of driving deer is not highly recommended because there is so much danger of accident. Neither should hunters go out in large parties, because the more men there are in the woods the greater the danger.

In the drive method when two or three hunters work together, the hunter on guard, watching for the outcoming deer, is posted at a likely runway down which any deer,

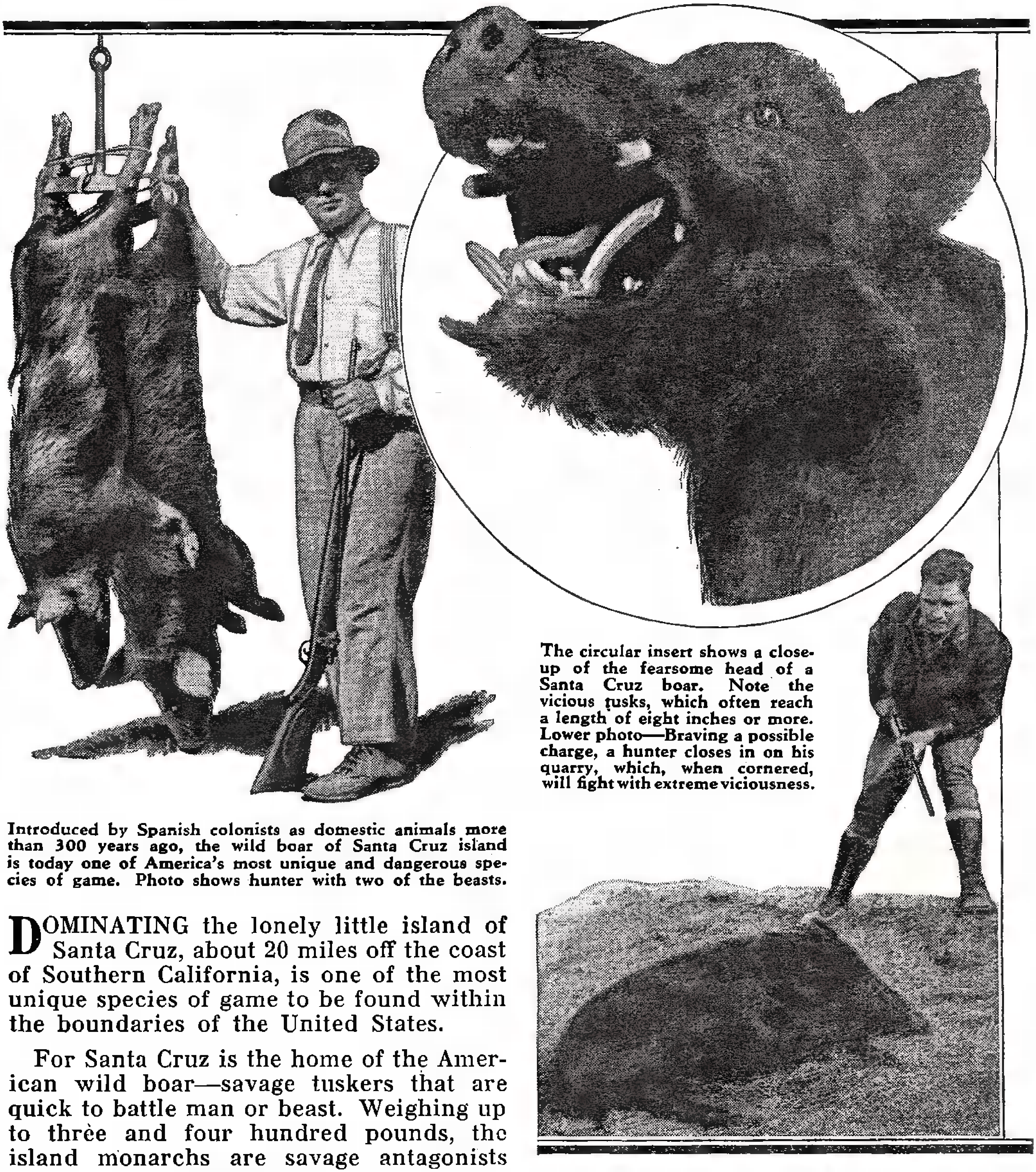
(Continued on page 130)



Beating a trail back to the cabin after a day in the woods is often a ticklish problem for the lone hunter unskilled in woodcraft. In the accompanying text are a number of valuable suggestions to offset the dangers of being lost.



America's Unusual Sport—Hunting Vicious Wild Boars



Introduced by Spanish colonists as domestic animals more than 300 years ago, the wild boar of Santa Cruz island is today one of America's most unique and dangerous species of game. Photo shows hunter with two of the beasts.

The circular insert shows a close-up of the fearsome head of a Santa Cruz boar. Note the vicious tusks, which often reach a length of eight inches or more. Lower photo—Braving a possible charge, a hunter closes in on his quarry, which, when cornered, will fight with extreme viciousness.

DOMINATING the lonely little island of Santa Cruz, about 20 miles off the coast of Southern California, is one of the most unique species of game to be found within the boundaries of the United States.

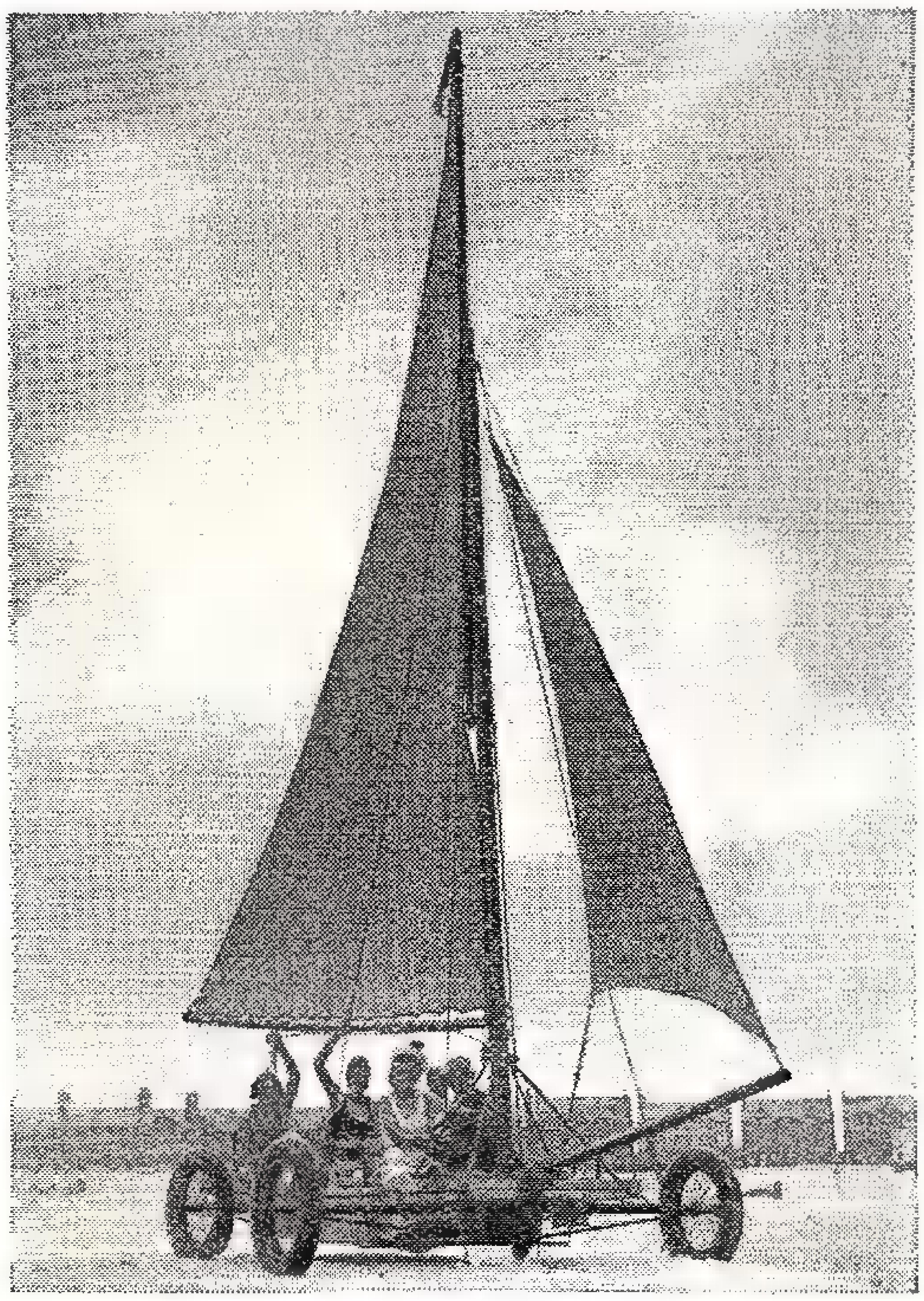
For Santa Cruz is the home of the American wild boar—savage tuskers that are quick to battle man or beast. Weighing up to three and four hundred pounds, the island monarchs are savage antagonists with the viciousness and vitality of a wounded grizzly bear.

These fighting animals are not native to the island or the neighboring mainland. They were introduced to Santa Cruz following the establishment of Spanish colonies in the channel islands in 1542.

Since that time, the hogs have degenerated to the same state of viciousness as that of the wild boar of central Europe. They have fearsome heads, high, bristling shoulders and knife-like tusks.

Elusive in open country, the Santa Cruz boar is hunted with dogs and heavy rifles.

Yacht on Wheels Furnishes Sailing Thrills to Landlubbers



This party of English merrymakers is out for a sail on the beach in a shoregoing yacht with automobile wheels.

LANDLUBBERS who may have secret yachting ambitions yet be dubious about their seagoing abilities may now enjoy sailing thrills to the full, tacking and luffing to their heart's content without ever leaving the security of the beach.

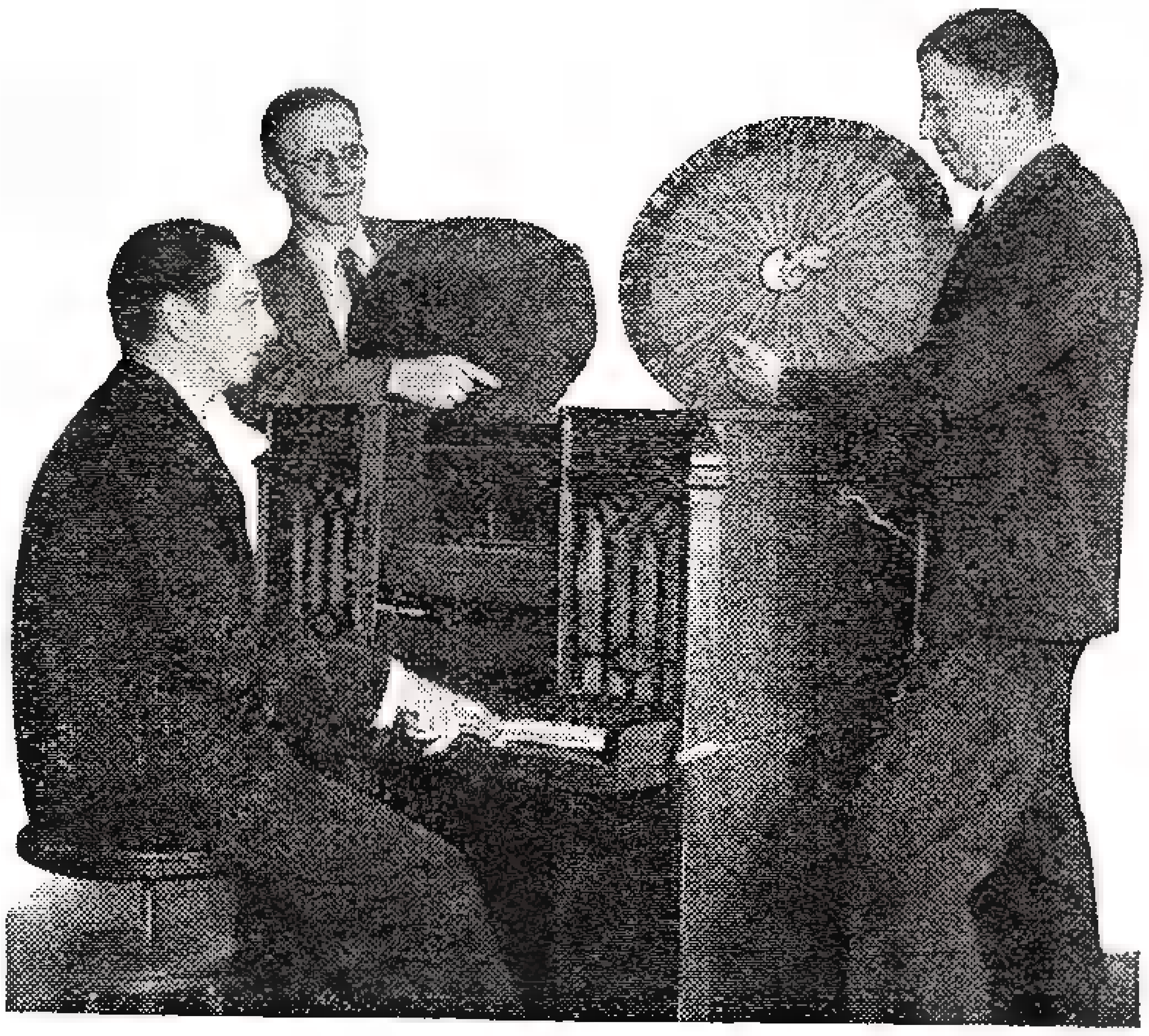
Originating at European watering places, sand yachting proved immensely popular and threatens to start a new sport vogue in America.

A light platform, capable of supporting the weight of mast, sail and passengers, is mounted on four pneumatic automobile tires. The mast which carries the mainsail is stepped slightly forward, with a bowsprit supporting the auxiliary canvas. The hybrid craft is guided by an ordinary auto steering wheel.

With a spanking breeze aloft and a hard-packed beach below, the land yachts skim along with surprising speed.

Organ Creates Photocell Music

BUILT from a dishwasher motor, an old keyboard and other gadgets, a home-made organ creates photoelectric music. A film sound track of tones is re-photographed on one of two revolving disks. Beams of light shine through these disks and reach a photocell. The light is then turned into sound, reproducing original tone.



Left to right: Joseph Wayne, James Nuthall and Frederick Sammis, grouped around home-made photoelectric organ.

Shatter-Proof Eyeglasses Tested

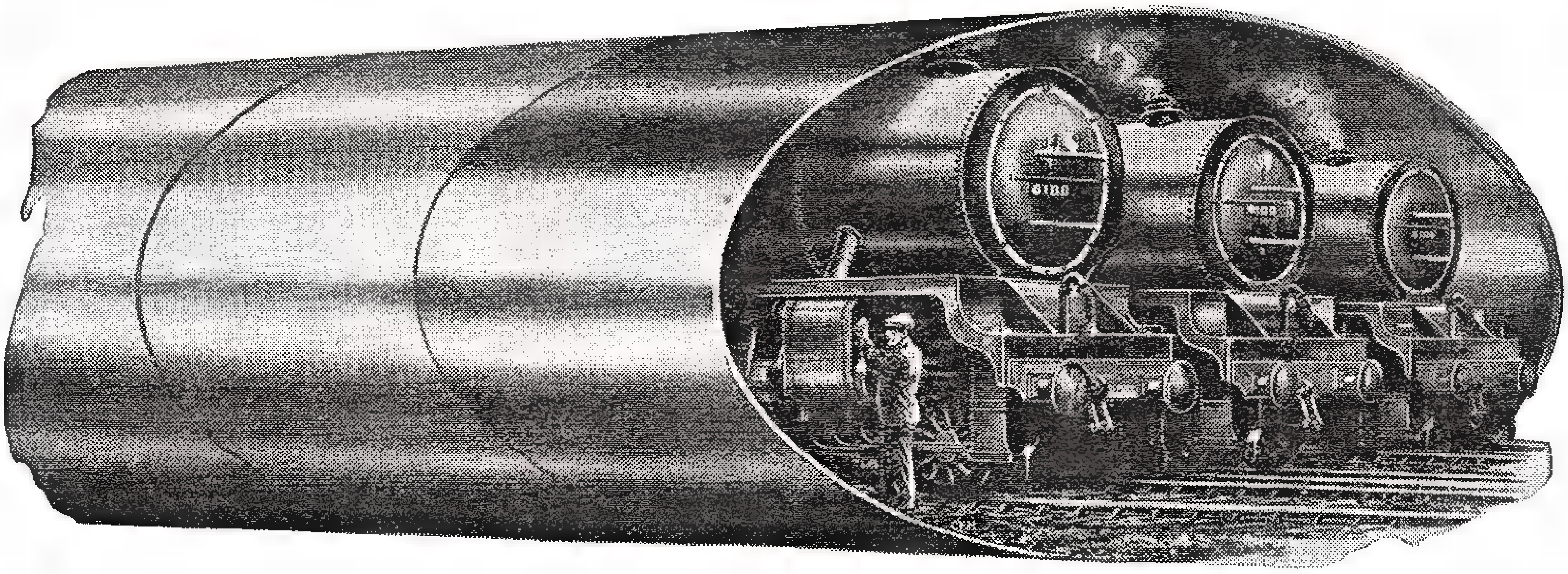
Photo shows the shatter-proof spectacles with glass intact. Subject holds the tool with which the glass was tested.

SAFETY glass for spectacles recently passed a successful test in London, England. Pounded with a hammer, the glass was marked with myriad lines but remained intact. The shatter-proof eyeglasses are said to be especially recommended for athletes engaged in such strenuous sports as tennis, football and baseball.

Light Ray Serves as Air Defense

GIANT light rays of 1,000,000 candle-power may protect cities from aerial attack in future wars by blinding pilots of bombing planes. Recent experiments with a 150,000 candlepower projector in France have proved that it effectively blinds the pilot in its beam at a distance of one mile.

Sea Liner's Stack Holds Three Locomotives



As an indication of the giant size of the Cunard super-liner, long under construction at Clydebank, Scotland, this drawing shows three locomotives of the "Royal Scot" type easily stowed within one of the ship's huge 30-foot funnels.

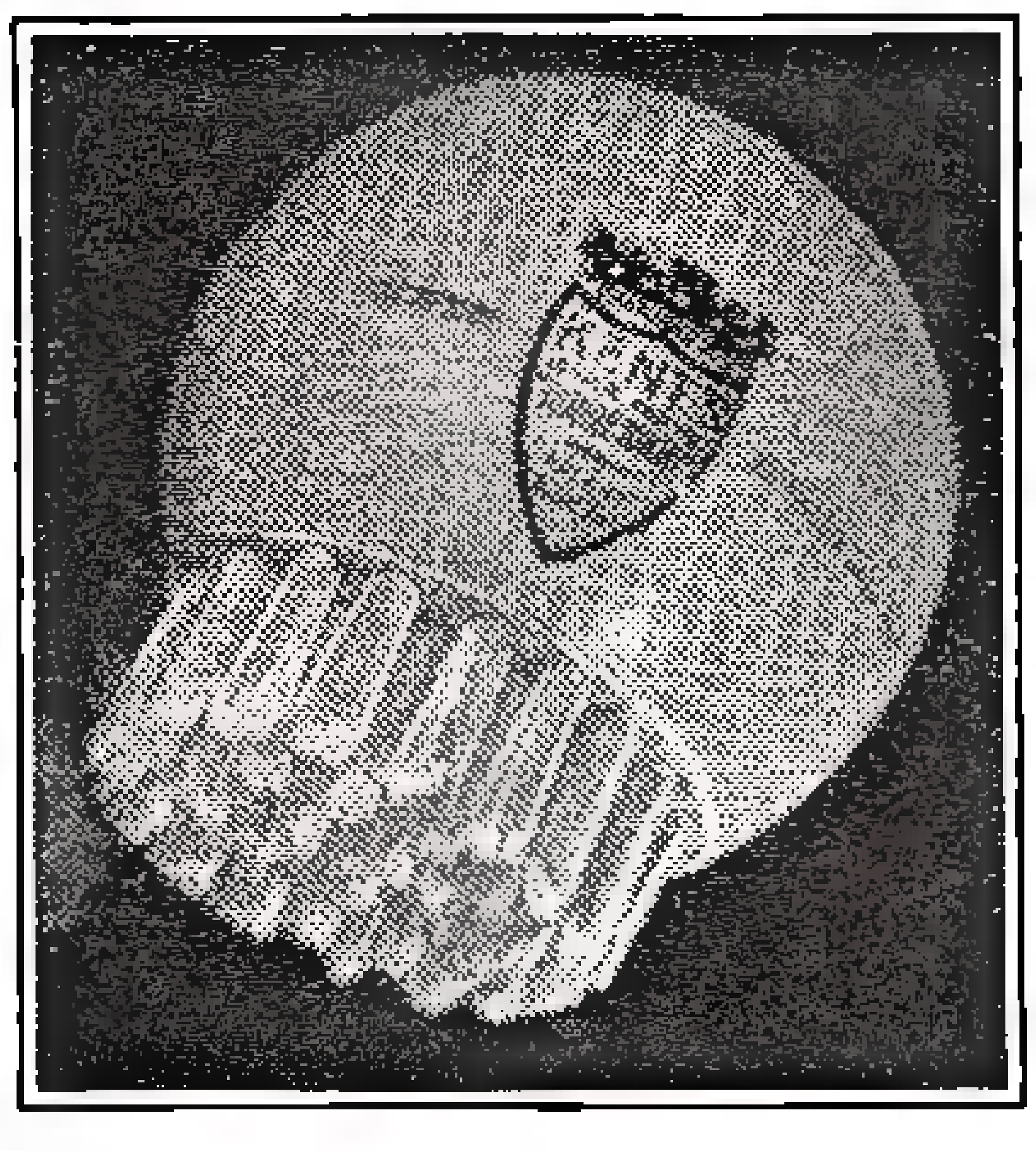
LARGEST British ship ever to be launched, a new Cunard super-liner, is of such gigantic size that three huge railroad locomotives may easily be stored, side by side, in one of its mammoth funnels.

Known only as No. 534, the giant ship has been closely guarded throughout the course of its construction at Clydebank, Scotland. Building details have been kept secret for the most part; and not even the tonnage was known before launching although estimates placed its gross as high as 85,000 tons.

The size of the ship's funnels, however, give some indication of the tremendous scale upon which the new liner is built. Each of the three stacks is approximately 30 feet in diameter. This figure exceeds by a few inches the diameter of the famous Holland tunnel, New York City.

Another unusual feature of the liner is the manner in which the height of the stacks is graduated. The first funnel is tallest, the third shortest—a device expected to keep the top decks clear of smoke.

Round Hand Brush Drains Itself



Ball-shaped handle rolls brush on its side to drain and dry.

IF LAID down with the bristles upward, a new hand brush automatically rolls or tumbles on its side in a drain-and-dry position.

The round, ball-like handle fits snugly into the palm of the hand and because of its shape is necessarily used every time in a different scrubbing direction. This causes the brush to wear down evenly.

Woman Tests New Fireproof Suit

TO PROVE her faith in the non-inflammable qualities of a fireproof jacket and helmet designed for airmen, Mlle. Biget, a French stunt woman, transformed herself into a living torch. The rest of the outfit consists of a pair of non-sinking overalls which Mlle. Biget will test by crossing the Channel from Calais to Dover, propelled by a portable motor. The stunt artist admits she cannot swim and is trusting her life to the non-sinking qualities of the overalls.

Photo shows Mlle. Biget, French stunt woman, successfully demonstrating the fireproof qualities of new airman's suit.

Paris Solves Traffic Problems With Subway Auto Road

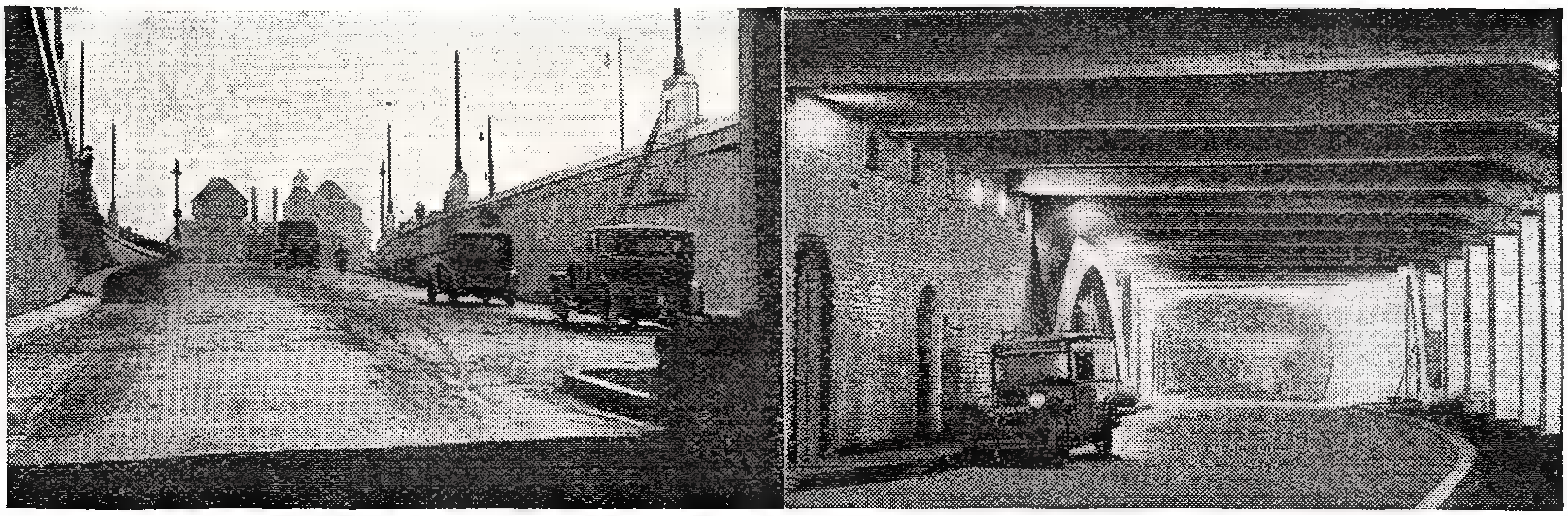


Photo left shows one of the approaches leading up from Paris' new auto subway. Right—Interior view of the huge tunnel which is helping to eliminate congestion in Paris streets. Doorways in walls lead to street and shops above.

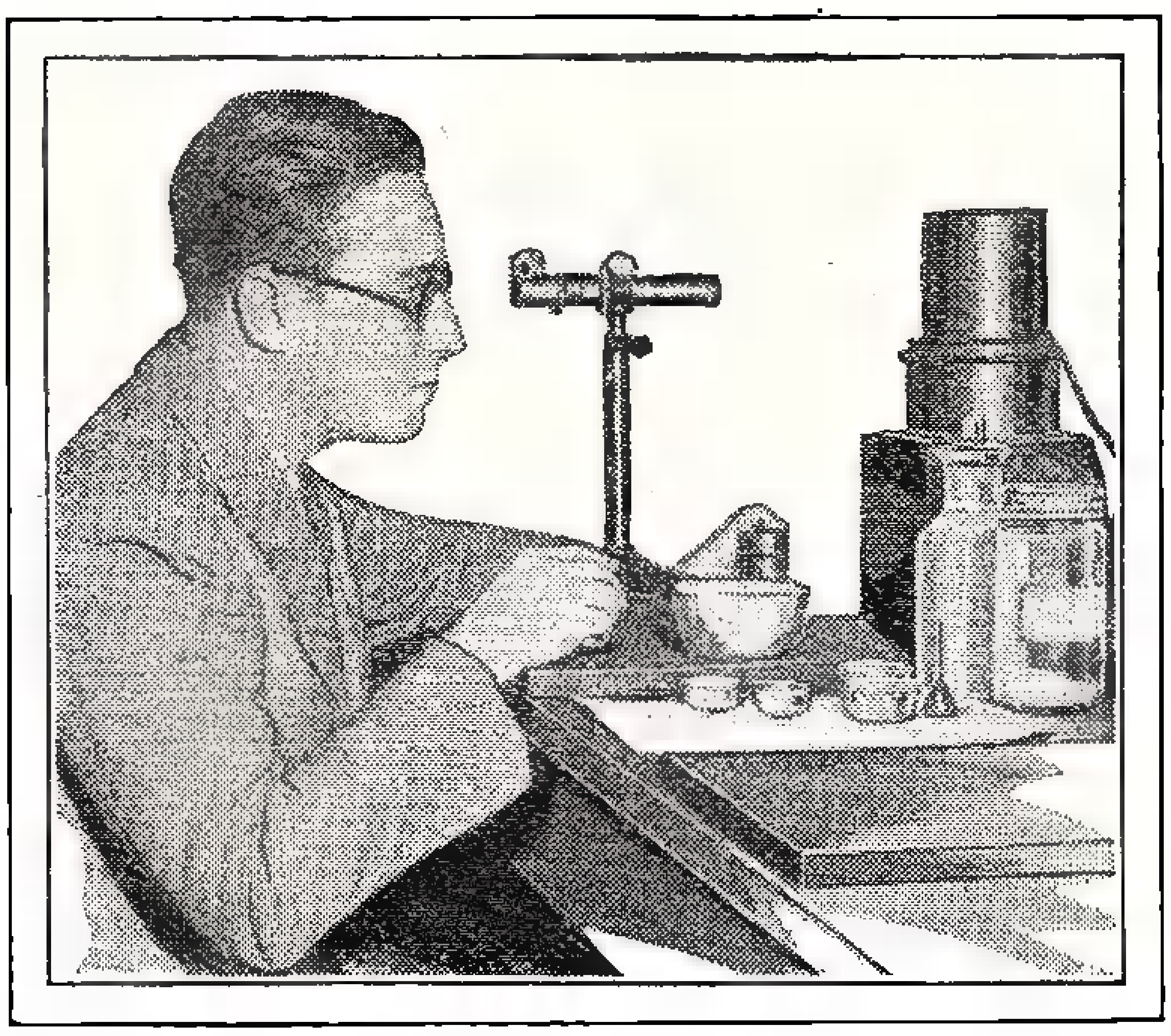
Isolates Million-Dollar Element

THE world of scientific chemistry was recently amazed by the successful isolation of the rare element, protoactinium, by Dr. Aristid Von Grosse, visiting assistant professor who has been conducting a series of experiments at the University of Chicago.

One of the rarest of the 92 known chemical elements, protoactinium is as costly as it is rare. One ounce of the metal is valued at $1,000,000, and it is said that Dr. Von Grosse's success in effecting its isolation is comparable to the purification of radium by the famous Curie family.

Contemporary workers were given definite proof of the success of the young scientist's experiments at a convention of the American Chemical Society recently held in Cleveland. There Dr. Von Grosse exhibited a tenth of a gram of the precious substance, attached to a tungsten wire.

The material is silvery in color, radioactive and has rays more penetrating than radium.



Dr. Aristid Von Grosse, who succeeded in isolating the rare element, is shown at work in University laboratory.

FACED with an ever-increasing street congestion as the result of a steady growth in both pedestrian and automotive traffic, Parisian safety engineers have solved the problem by building a subterranean automobile road.

Wide and well lighted, the auto-subway runs under a large part of Paris and diverts a great amount of both automobile and pedestrian traffic from the crowded streets.

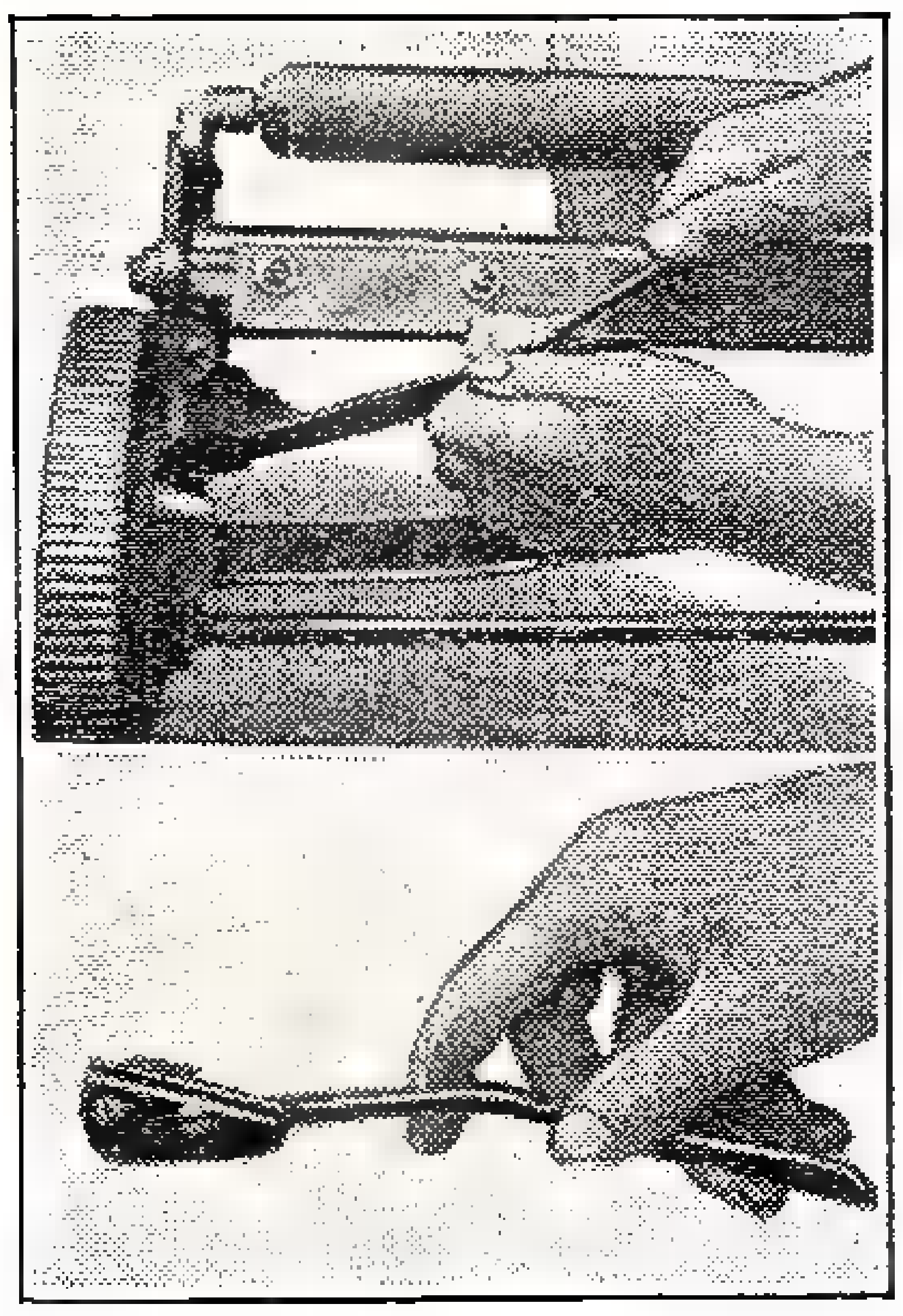
Sidewalks border both sides of the underground roadway, affording safe passage to pedestrians. At regular intervals in the tunnel walls are entrances which lead to stores and to the street level above. This feature relieves congestion in the business district and is a boon both to shoppers and to truck drivers attempting to make deliveries.

The subway road is known as the "Holland Tube of Paris," and is only part of the ambitious program planned by French traffic experts.

Hand Gadget Sharpens Lawnmower

DULL lawnmower knives may now be sharpened by hand with a simple device possible for anyone to operate.

The sharpener, which remotely resembles a toothbrush, is placed over the knife-edge to be sharpened and is pulled along the blade with a steady pressure. One trip across the blade is said to sharpen dull edges.



Top photo—Knives are restored by drawing sharpener over them. Below—Closeup of sharpener.

Recover Lost OIL TOOLS With Magnet

FISHING for oil tools lost at the bottom of a well has been vastly simplified by development of a powerful electric magnet which recovers objects quickly and surely whenever a contact can be made.

The magnet is lowered into the hole on a steel cable which has an insulated copper core. The magnetizing current flows down the core and returns through the steel exterior.

Lifting power of the device varies with the size of the magnet which is affected, in turn, by the diameter of the drill hole.

The magnet is streamlined in order that it may readily penetrate the viscous drilling and reach the lost tool. After making the contact, even under the high hydrostatic pressures of this mud, the magnet exerts the same lifting capacity as it would at the surface. Enclosure in its own casing prevents the magnet from sticking to steel wall of the hole.

Balanced on a narrow bar, a trio of oil workers demonstrates the enormous lifting powers of the electric magnet.

Auto Seat Gives Infants Comfort

Children may motor in comfort, supported by arm and foot rests in this new seat especially designed for infants.

WHEN the very young members of the younger generation go motoring, they may now ride in comfort, thanks to a new auto seat especially designed for infants.

The device is, in effect, a small chair which is placed on top of the regular seat cushion. Side arms give the child support and a convenient footrest keeps small shoes from scuffing the seat upholstery. The seat provides the child with full vision and is said not to come loose or jar out of place. Straps furnish the necessary adjustments.

'Mummy Seed' Grows Giant Wheat

WITH seed taken from a 5000-year-old Indian tomb, Colonel Claibborn, New Forest, England, has grown a crop of "mummy" wheat of astounding size. All the seeds germinated and produced a series of healthy shoots which reached an average height of seven feet.

New Vanity Case Holds Door Key

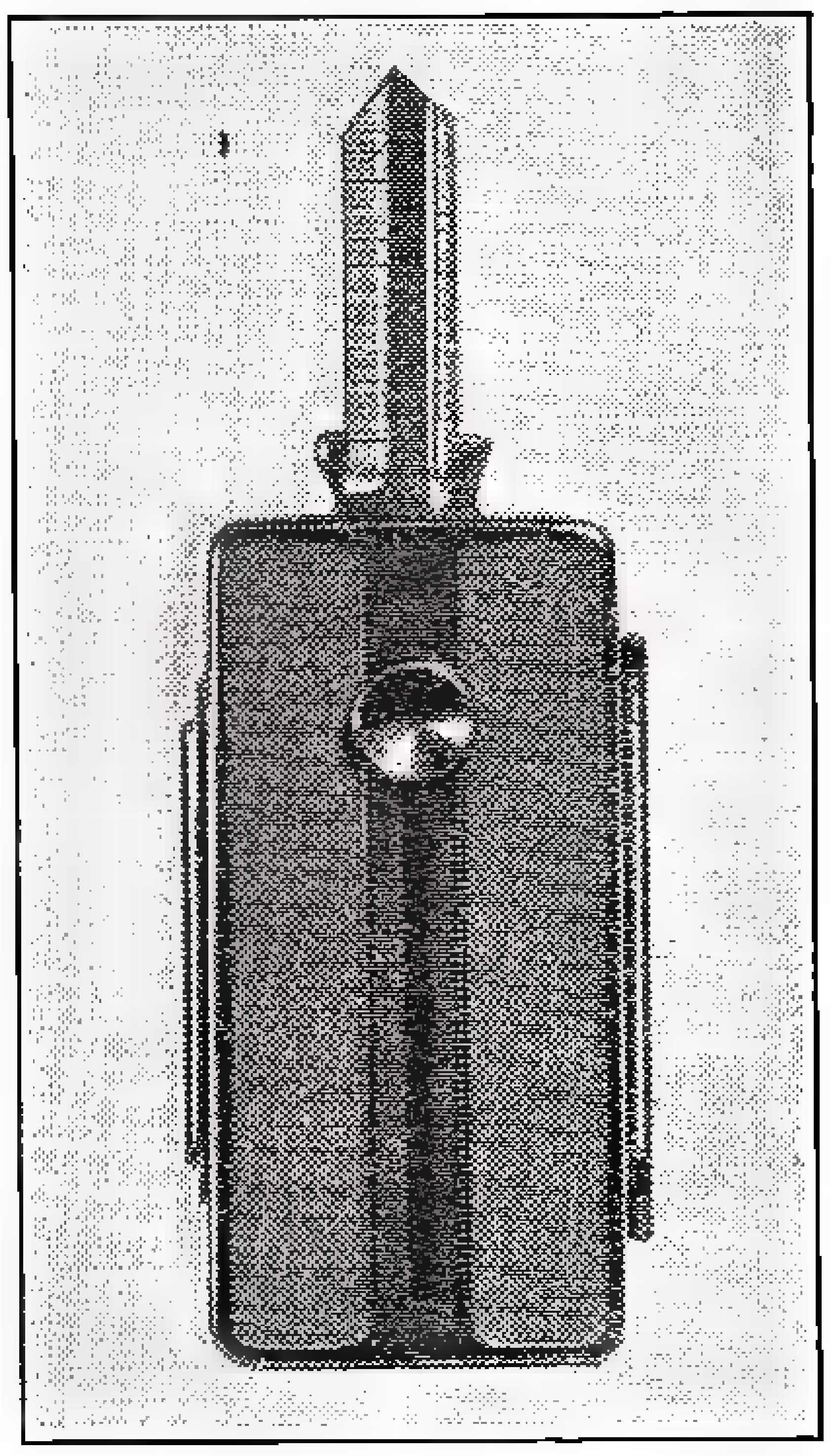


Photo shows how door key fits snugly into this new vanity case.

LADIES need no longer grope at length through their handbags in a search for an elusive house key. A new compact holds the key securely in place under a metal mirror until it is ready for use.

By sliding a thumb button along a groove in the vanity case, the key is quickly ejected through a slot.

The vanity is a regulation compact, complete with metal mirror, rouge and face powder.

Police Dog Rides Aquaplane Behind Speeding Power Boat

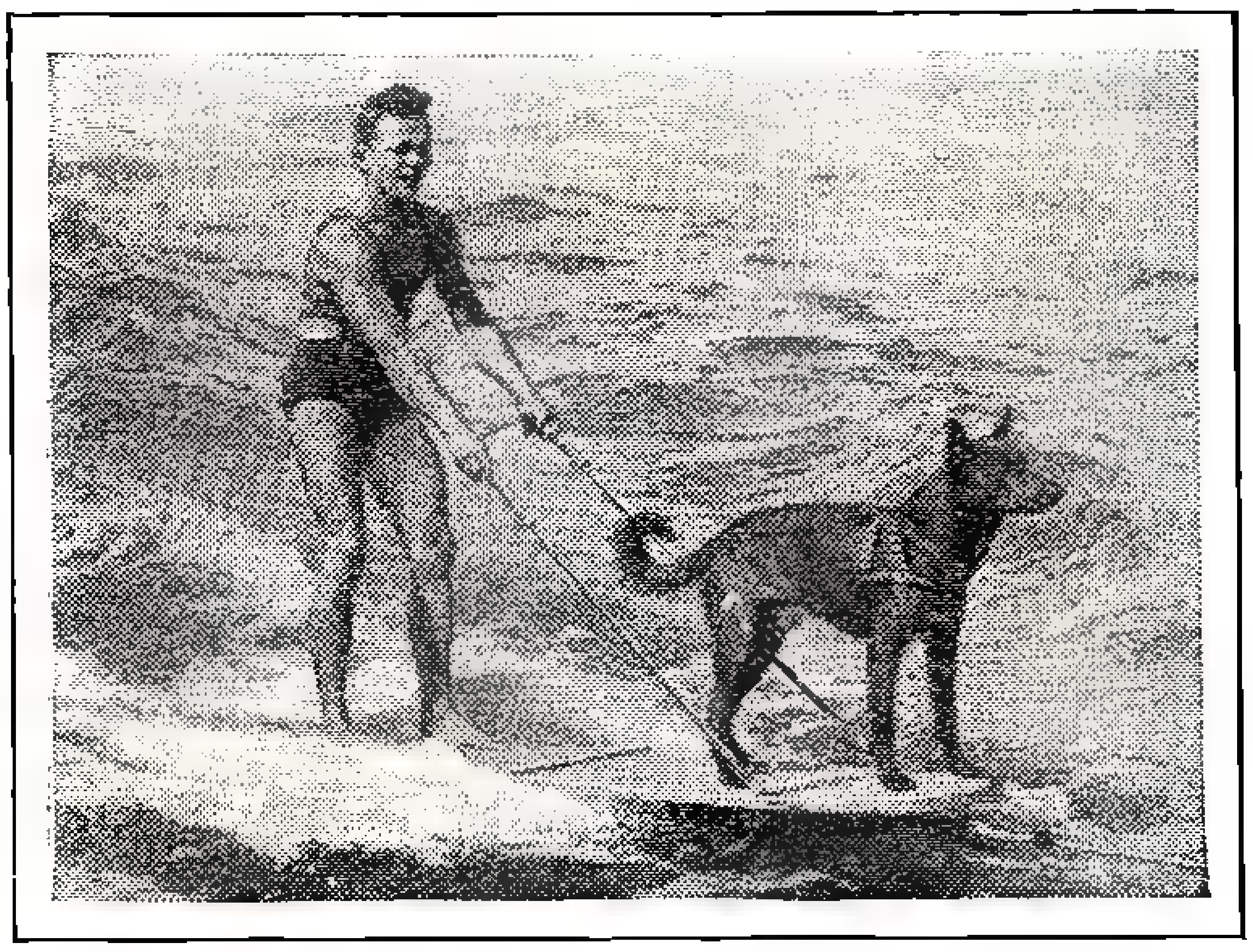


Photo shows Rex, Belgian police dog, aquaplaning off Atlantic City. Rex seems to enjoy doing his stunts and thinks nothing of performing them a half mile from shore.

ONE of the sensations of a recent water circus held at Atlantic City, N. J., was the performance of Rex, Belgian police dog, who gave a demonstration of plain and fancy aquaplaning behind a speeding power boat.

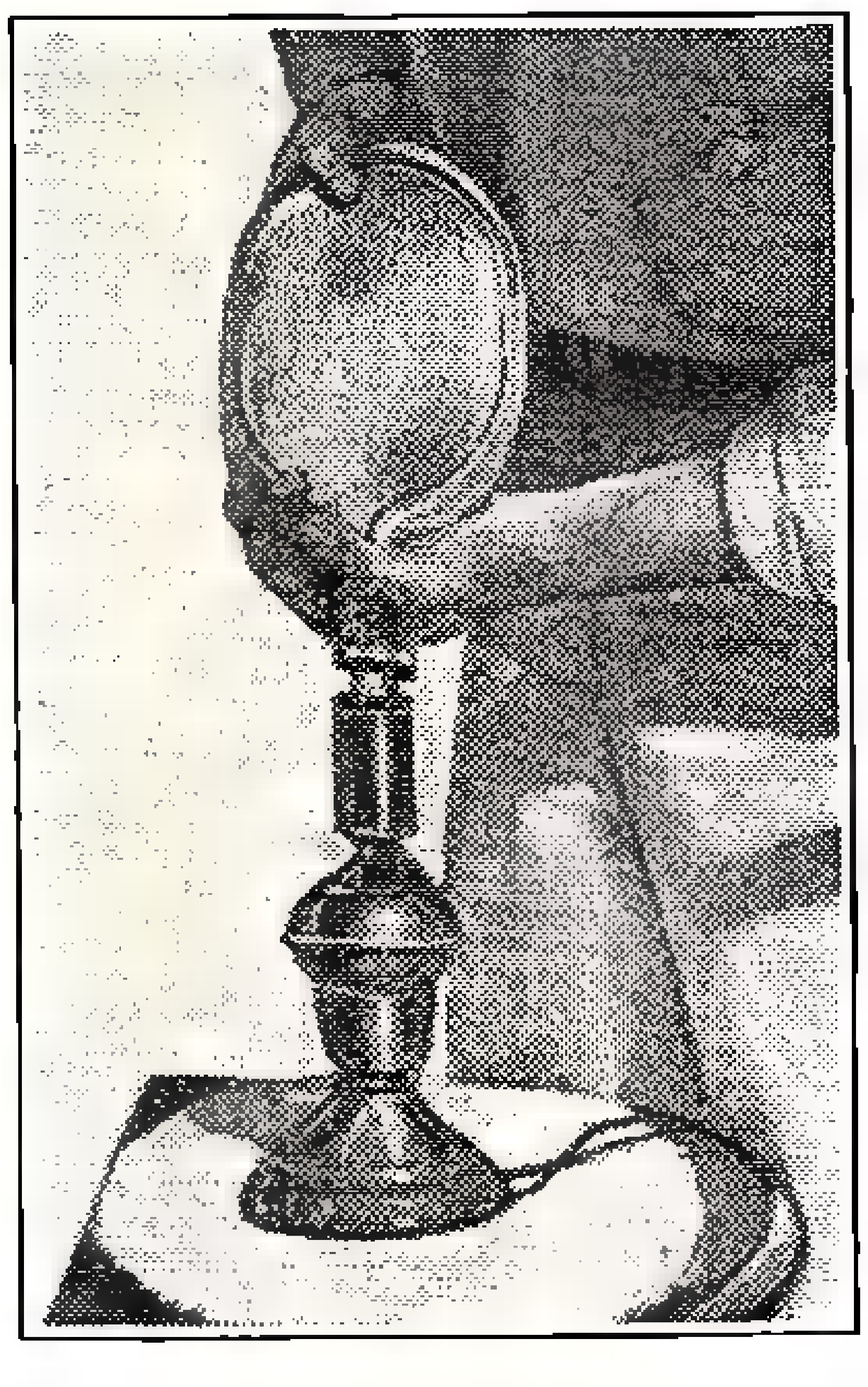
The secret of Rex's success lies in his remarkable sense of balance. Although the plank may skitter across the waves and sometimes bounce him six inches in the air, Rex has no difficulty in regaining his foothold. He seems to enjoy doing his stunts and is possibly the only dog in the United States who performs a half mile from shore on the open ocean.

Heating Pad Is Made of Bronze

BECAUSE of its bronze construction, a new heating pad need be plugged into the electrical circuit for only a few seconds to heat the pad to a point where it stays warm for hours.

The new heating unit is shaped like a hot water bottle and is made of bronze. This material has a tendency to distribute heat evenly hence the pad is of the same temperature throughout.

The danger of fire or personal injury which might be caused by an electrical short circuit is said to be eliminated with the new device. The pad is plugged into the circuit, allowed to heat for a few seconds and is then removed from the socket before being used by the patient.



Pad is heated by screwing into light socket on regular circuit.

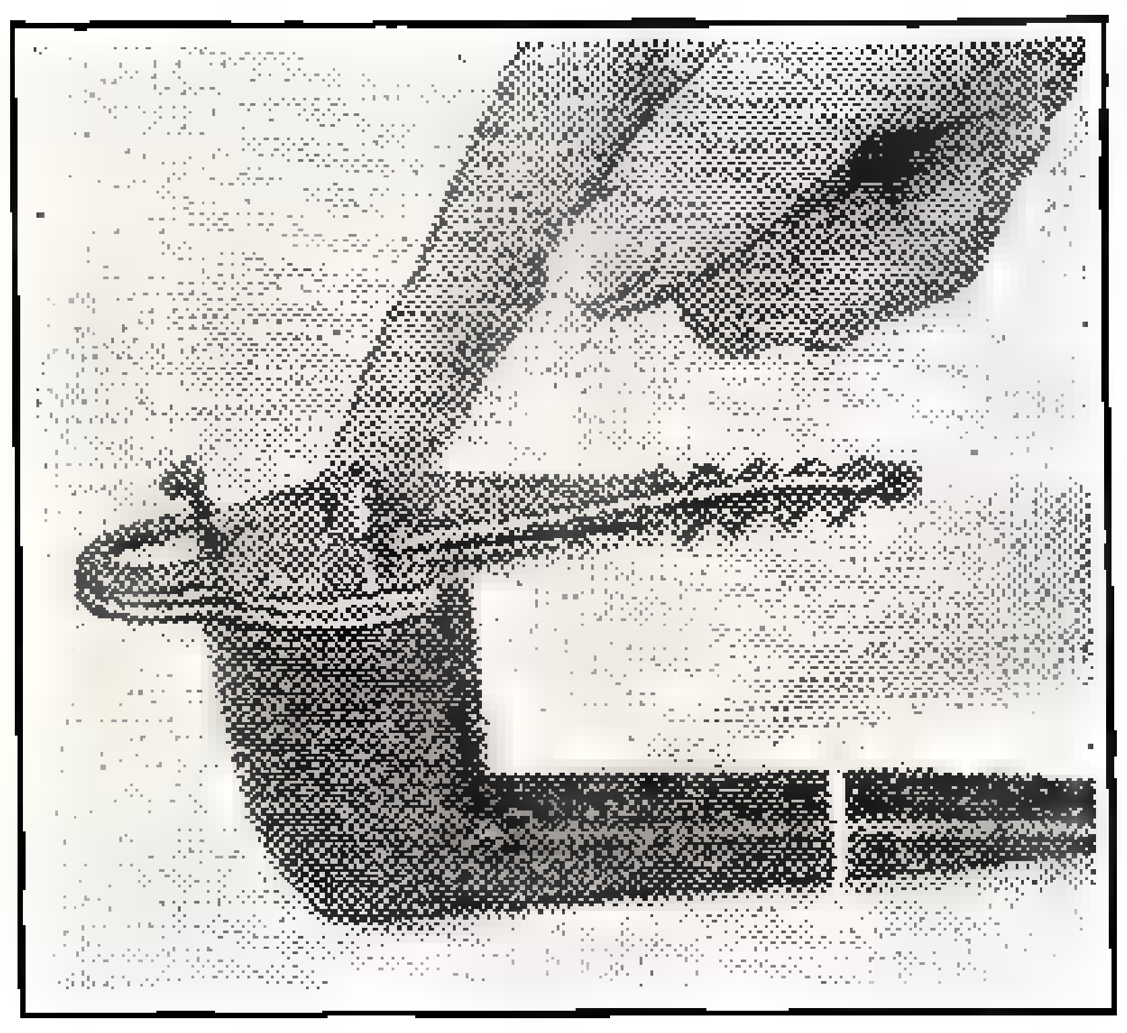
New Robot Solves Math Problems

A NEW mathematical robot known as the "trianalyst," is expected to solve complicated problems in arithmetic, algebra and trigonometry more quickly and easily than a trained mathematician.

The contrivance is an uncomplicated mechanical apparatus based on geometrical principles. Its flat framework has the general shape of a right triangle and contains an inscribed square. The device has been invented by Barrett R. Wellington, a practicing attorney of Troy, N. Y., interested in mathematical research.

Smokers' Gadget Has Varied Uses

A SMALL steel smokers' gadget combines bottle opener, pipe reamer, stem opener and small screw driver in one. When device is placed on top of bowl tight fit is secured when blowing pipe out under air pressure at gas stations.



Gadget in this position permits cleaning pipe with air pressure. Device also serves as a reamer.

Back Yard Well Produces Gasoline

SOME of the more fortunate residents of Long Beach, Calif., are doing a nice business in gasoline which has been pumped from their own back yards. Presumably because of seepage from the Signal Hill wells, nearby, a number of Long Beach back yards are fairly rich in gasoline. Presence of the precious liquid was discovered during the drilling of a cesspool some months ago. Since then a number of crude pumping systems have been installed, some of which produce as high as 400 gallons of casing head gasoline in 24 hours.

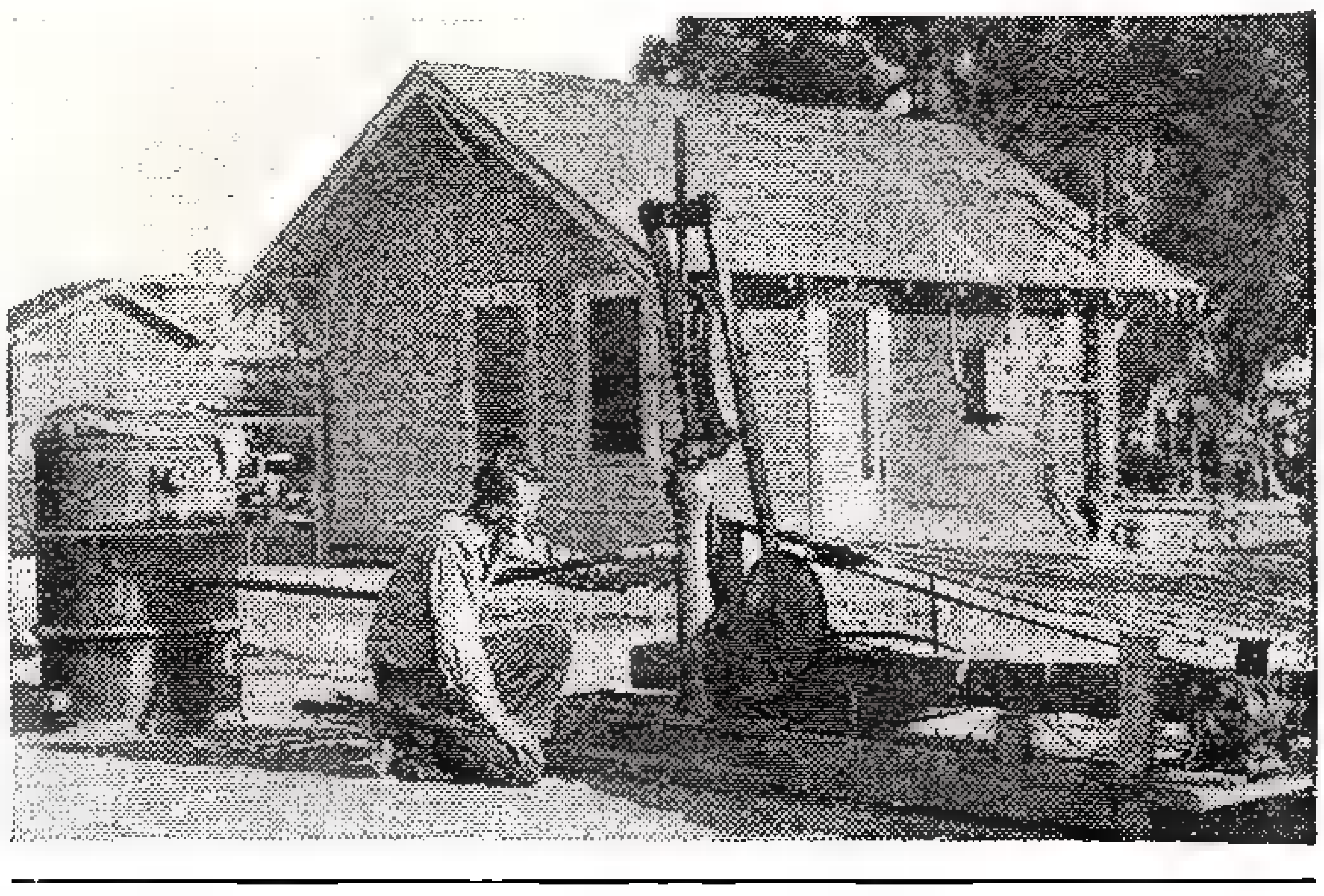
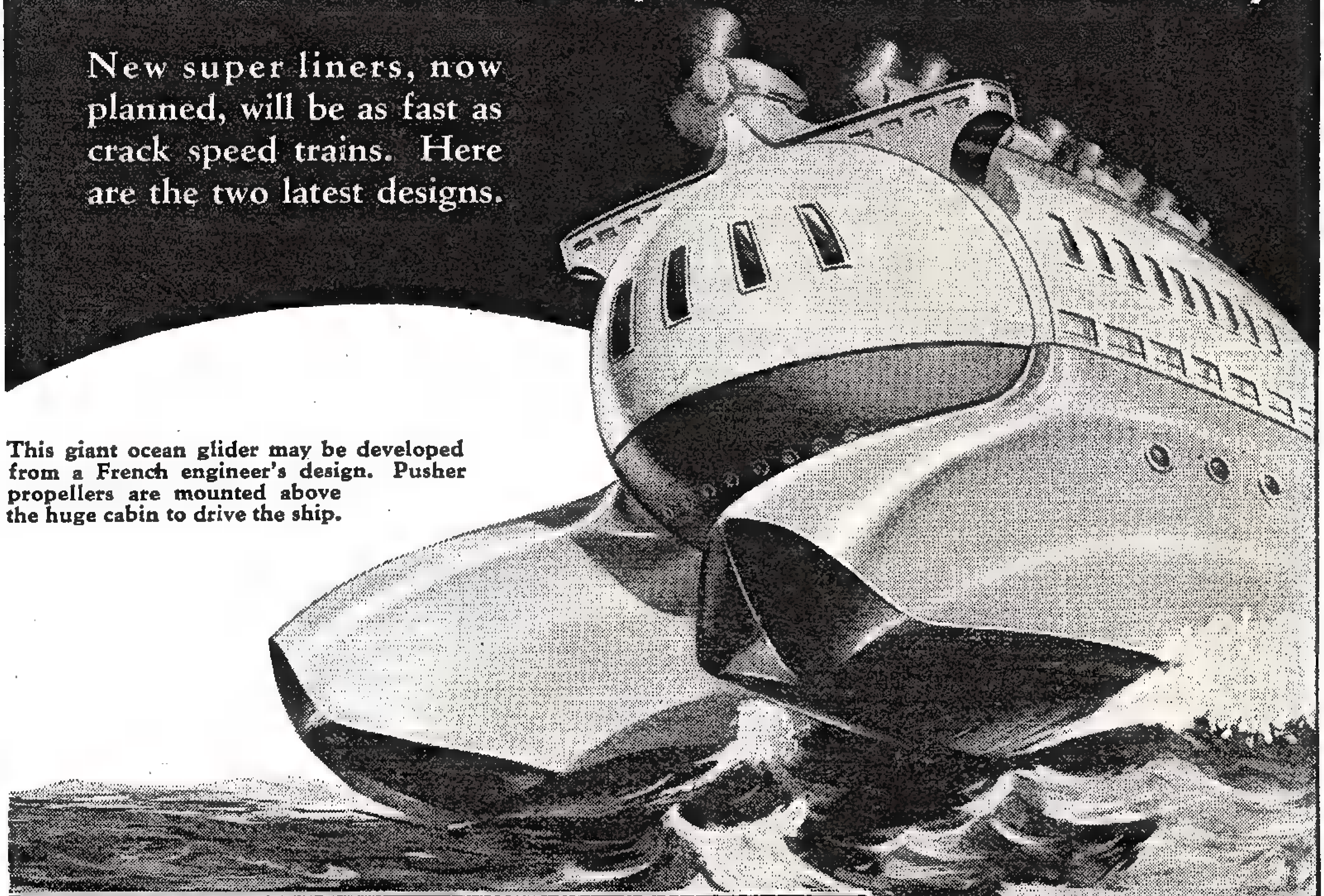


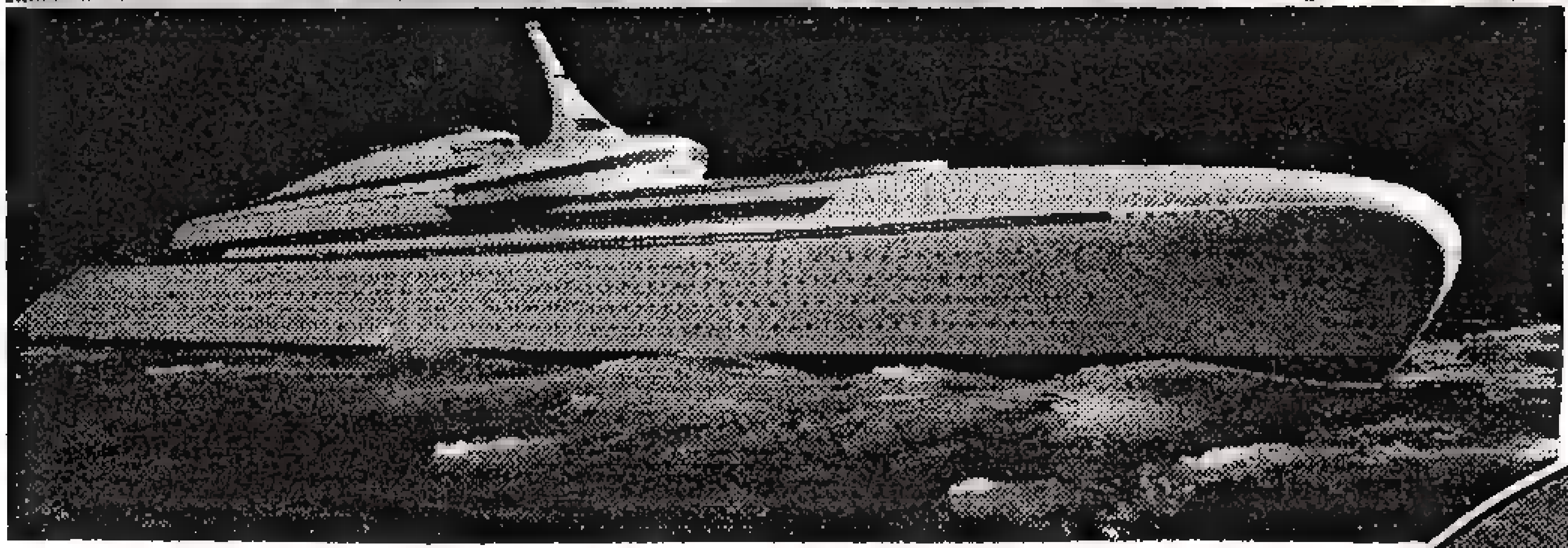
Photo shows Walter Tifft, Long Beach, with drilling outfit which produces 400 gallons casing head gas in 24 hours.

SEA GLIDER to Span Atlantic in 3 Days

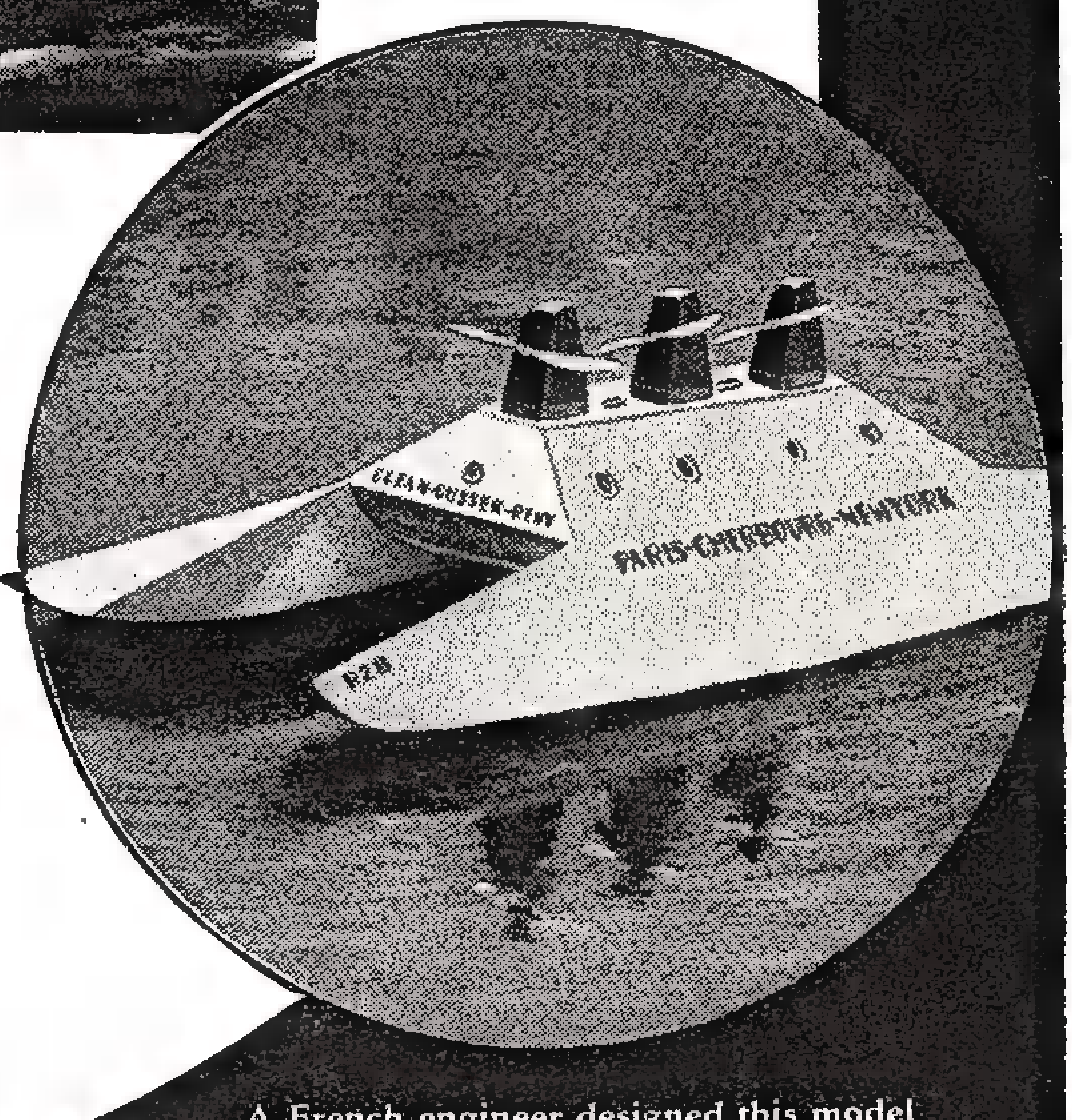
New super liners, now planned, will be as fast as crack speed trains. Here are the two latest designs.



This giant ocean glider may be developed from a French engineer's design. Pusher propellers are mounted above the huge cabin to drive the ship.



Streamlined model at left was designed by A. E. Northup, of Detroit.



A French engineer designed this model glider. He is now planning a full sized ship for regular Atlantic crossings.

MODELS tested in the Seine River may lead to the development of giant ocean gliders capable of crossing the Atlantic in 2½ to three days.

Following the design of models of a French engineer, the fast sea liner would have two large pontoon hulls to steady the ship and cut down water resistance. Gasoline motors and pusher propellers, mounted tandem along the length of the hull, could drive the ship 40 to 50 miles an hour judging from model tests.

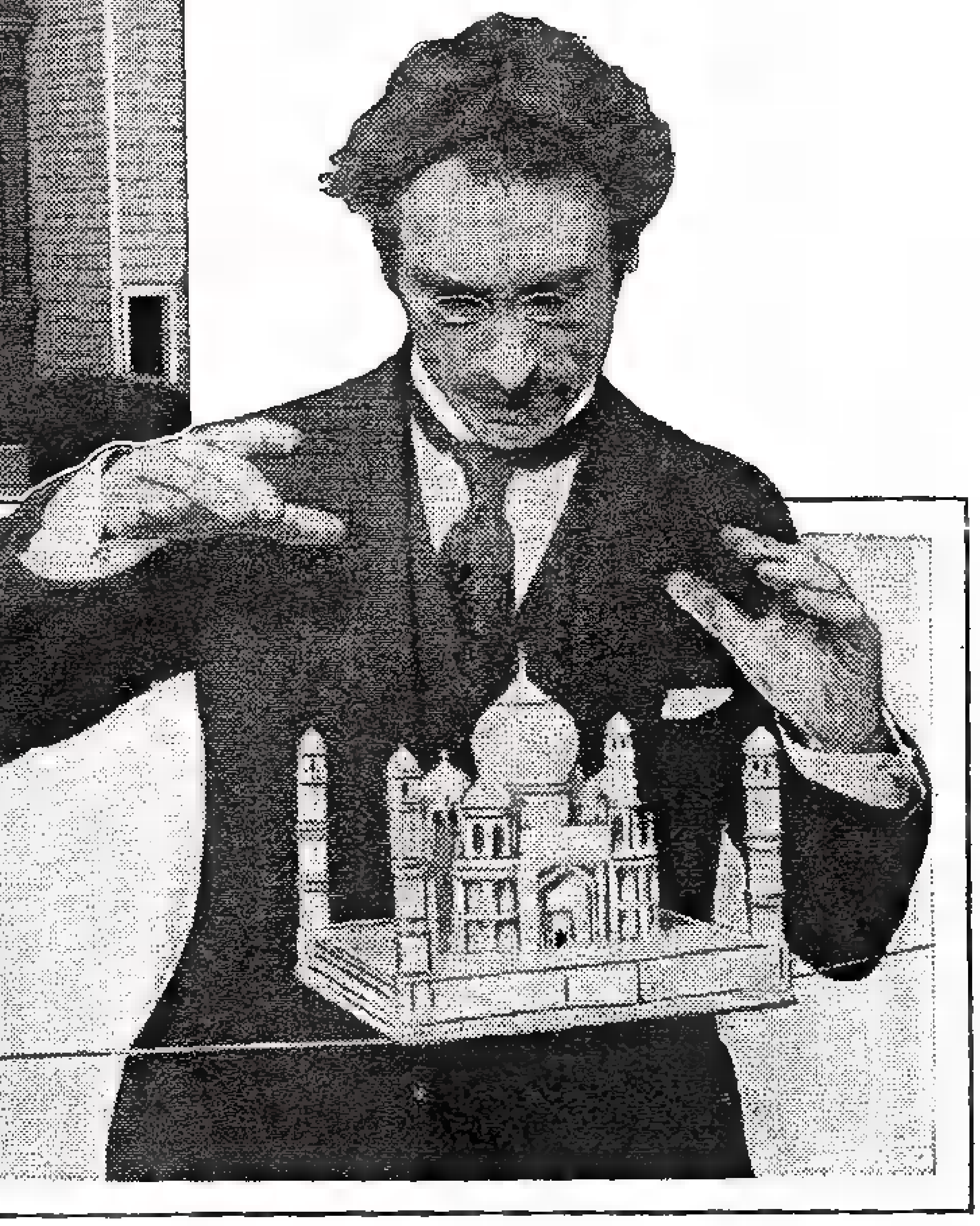
In America Amos E. Northup, of Detroit, famous industrial designer, has built a radically streamlined ship model. Wind tunnel tests with the Northup model show that it is capable of 40 knots, or 46 land miles an hour.

Exploring CALIFORNIA'S

Neighborhood children call this house "haunted," for behind its modest exterior lies a wonderland of beautiful interiors and strange devices which work mechanical marvels.

by

DEAN S. JENNINGS



Dr. Nixon, owner of the mystery house, demonstrates one of his illusions—the suspension in mid air of a miniature Taj Mahal. The cord, visible in the picture, has been passed below the model to show that nothing supports it.

THE neighborhood kids call it the "haunted house."

It stands forlornly on the street, its corroded brown front and ominously shaded windows dusty and forbidding amidst a splash of fine homes and apartment citadels in one of San Francisco's exclusive residential districts.

It isn't "haunted," of course.

But behind its door lies mystery, with a hollow-eyed wizard wielding a magic wand.

For inside the house there are hand-carved portals that open at a command, unseen flutes wafting dreamy melodies through the rooms every half hour, an organ that plays on an order from a human voice, a telephone that acts as a messenger and a woman robot that plays 3000 tunes on a zither.

The Mystery Mansion's Talented Master

This strange house, unique in California, is the creation of Dr. Cecil Nixon, inventive genius and mental giant who lives on a diet of science. For many years he has toiled with no thought of financial gain, sleeping little and working long hours both day and night.

A few years ago Dr. Nixon was listening to an organ concert.

"I must have an organ in my house," he said.

But good organs are expensive. Hence Dr. Nixon trudged to the public library, obtained all available text books on the art of organ building—and made one himself!

Today the mighty instrument occupies a great part of the Nixon basement and is the marvel of San Francisco's leading organists who declare that its delicate tone is unsurpassed by professional work. Yet Dr. Nixon has gone still further. By installing a number of microphones and an ingenious system of mechanical control, the organ is made to play at a spoken command.

Organ-building, however, is only one phase of Dr. Nixon's amazing versatility. If he is ill, he treats himself, for he has mastered medicine, has a thorough knowledge of pharmacy and compounds his own prescriptions.

If he has a toothache, he goes to his own office, for he is a graduate of dentistry.

If the house needs wiring, Dr. Nixon is a qualified electrician.

If the house requires alterations, his complete knowledge of architecture and building construction comes to the fore.

Rooms and the hallway on the ground floor are of museum beauty, sometimes somber, yet cathedral-like in tone. Walls and ceilings are rare woods, hand-carved by Dr. Nixon with excruciating detail. The

MANSION *of* MYSTERY

Guarded by weird figures, doors open and a mighty organ plays on command in a house of mystery presided over by a brilliant scientist and a beautiful, lifelike robot princess of ancient Egypt.

doors, exquisite portraits of wood design entirely hand-made, would excite a connoisseur. Dr. Nixon has applied sculptural ability to the fashioning of gargoyle heads in several rooms and a reproduction in bronze of a Parthenon frieze. Even the floors are inlaid in a delicate pattern.

Some of the gargoyles have discs concealed in their mouths. The voice, acting on a platinum point which in turn controls a gear arrangement under the floor, will open and close the doors in mystifying manner.

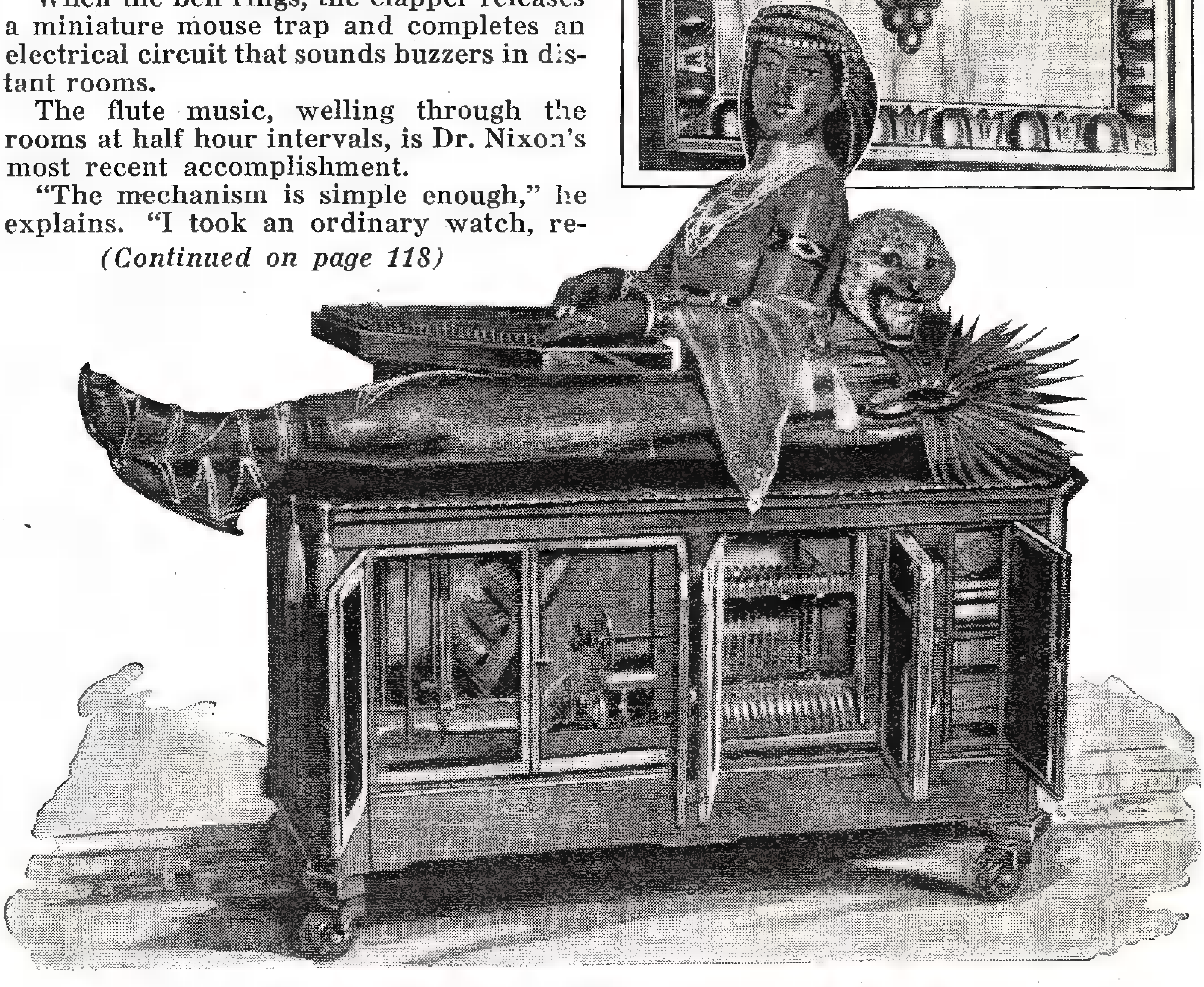
Even the telephone is unusual.

When the bell rings, the clapper releases a miniature mouse trap and completes an electrical circuit that sounds buzzers in distant rooms.

The flute music, welling through the rooms at half hour intervals, is Dr. Nixon's most recent accomplishment.

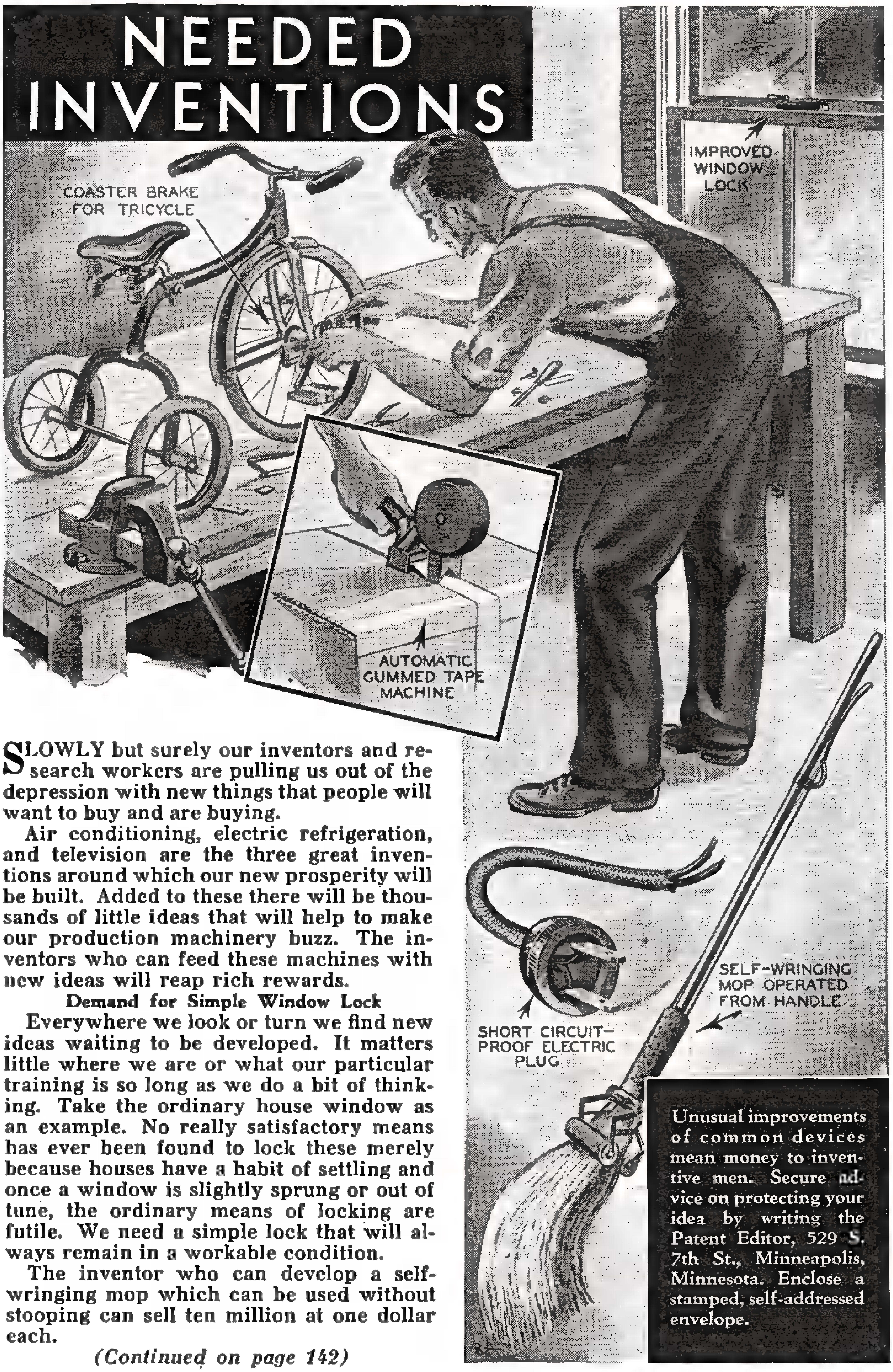
"The mechanism is simple enough," he explains. "I took an ordinary watch, re-

(Continued on page 118)



Upper photo shows one of the gargoyles carved by Dr. Nixon upon his doors. A disc in the gargoyle's mouth opens the door at sound of a human voice. Lower photo—Isis, queen of the mystery mansion, who plays three thousand tunes upon the zither at a spoken command, plucking out each note with an individual stroke of the metal picks in her hands

NEEDED INVENTIONS


COASTER BRAKE FOR TRICYCLE
IMPROVED WINDOW LOCK
AUTOMATIC GUMMED TAPE MACHINE
SHORT CIRCUIT-PROOF ELECTRIC PLUG
SELF-WRINGING MOP OPERATED FROM HANDLE

Unusual improvements of common devices mean money to inventive men. Secure advice on protecting your idea by writing the Patent Editor, 529 S. 7th St., Minneapolis, Minnesota. Enclose a stamped, self-addressed envelope.

SLOWLY but surely our inventors and research workers are pulling us out of the depression with new things that people will want to buy and are buying.

Air conditioning, electric refrigeration, and television are the three great inventions around which our new prosperity will be built. Added to these there will be thousands of little ideas that will help to make our production machinery buzz. The inventors who can feed these machines with new ideas will reap rich rewards.

Demand for Simple Window Lock

Everywhere we look or turn we find new ideas waiting to be developed. It matters little where we are or what our particular training is so long as we do a bit of thinking. Take the ordinary house window as an example. No really satisfactory means has ever been found to lock these merely because houses have a habit of settling and once a window is slightly sprung or out of tune, the ordinary means of locking are futile. We need a simple lock that will always remain in a workable condition.

The inventor who can develop a self-wringing mop which can be used without stooping can sell ten million at one dollar each.

(Continued on page 142)

Modern Science Invents Glass Blackboard for Schoolroom

SEEKING to overcome the shortcomings of the dusty, squeaky, old fashioned blackboards made of slate, scientists have perfected a new writing surface of black plate glass.

The glass blackboard permits perfect adhesion of the chalk, is easy to erase or wash and is not affected by moisture.

An abrasive evenly distributed through the texture of the glass catches the chalk particles, making inscriptions readable. Laboratory tests equal to 100 years of actual service—far exceeding the life of the schoolhouse—left the glass blackboard as good as new.

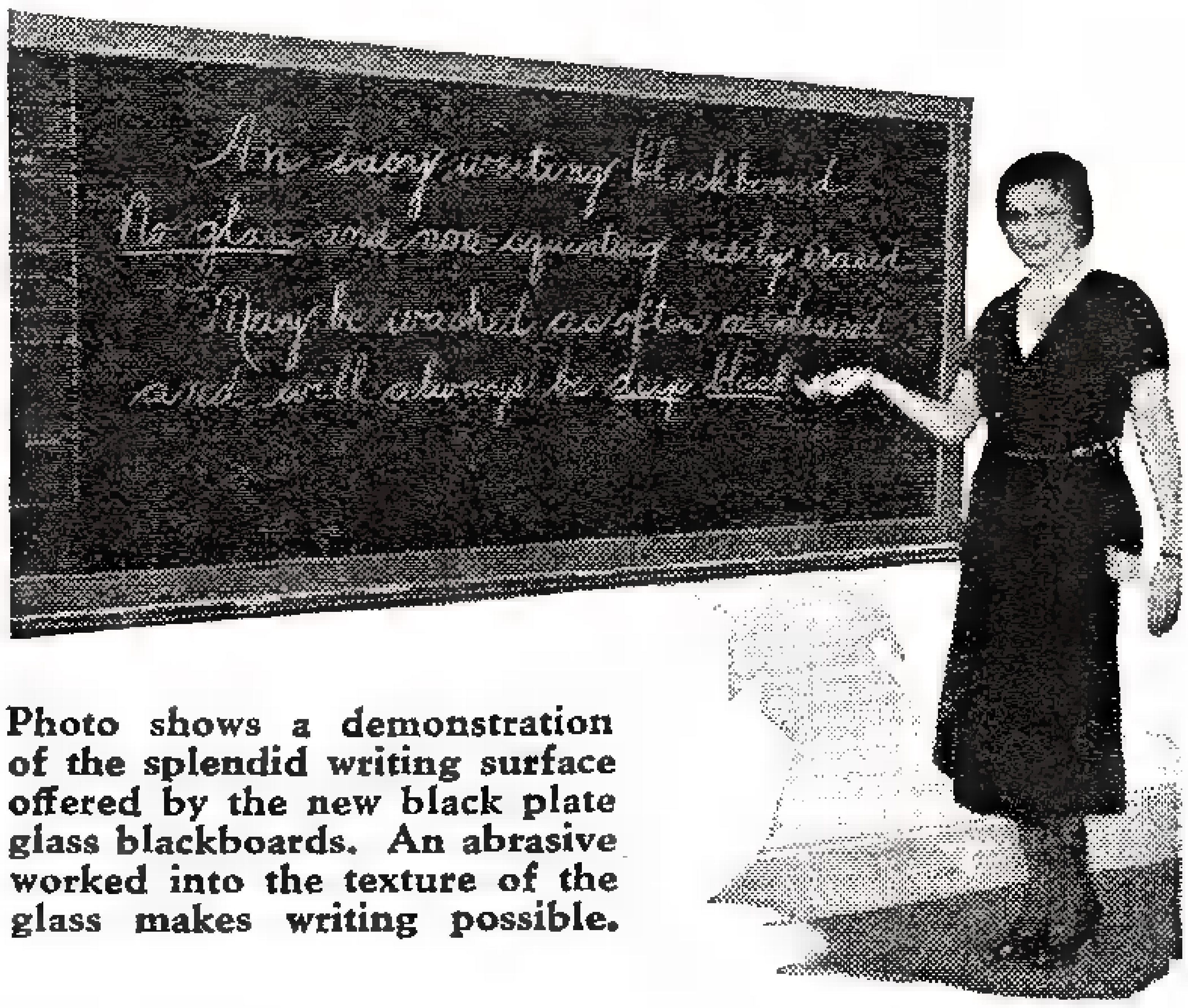
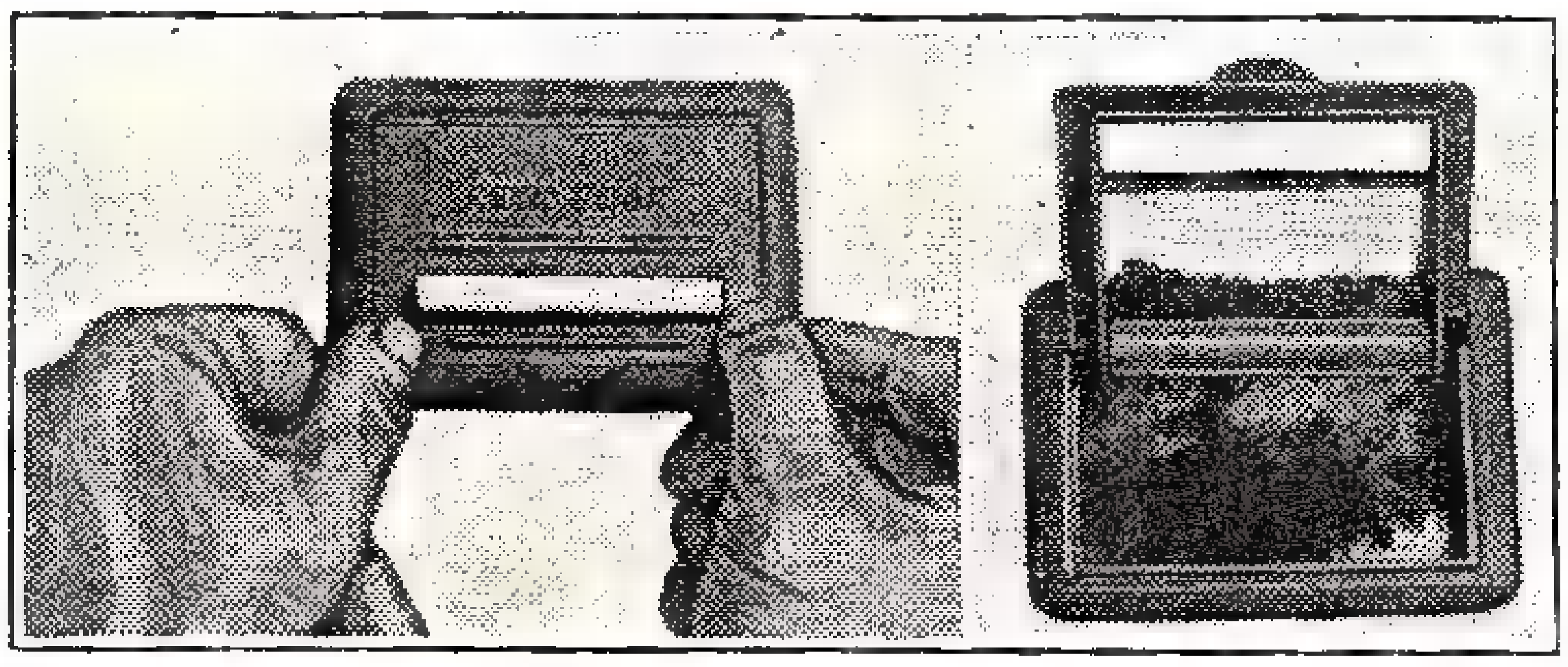

An easy writing blackboard
No glare and non-squeaking easily erased
May be washed as often as desired
and will always be deep black

Photo shows a demonstration of the splendid writing surface offered by the new black plate glass blackboards. An abrasive worked into the texture of the glass makes writing possible.

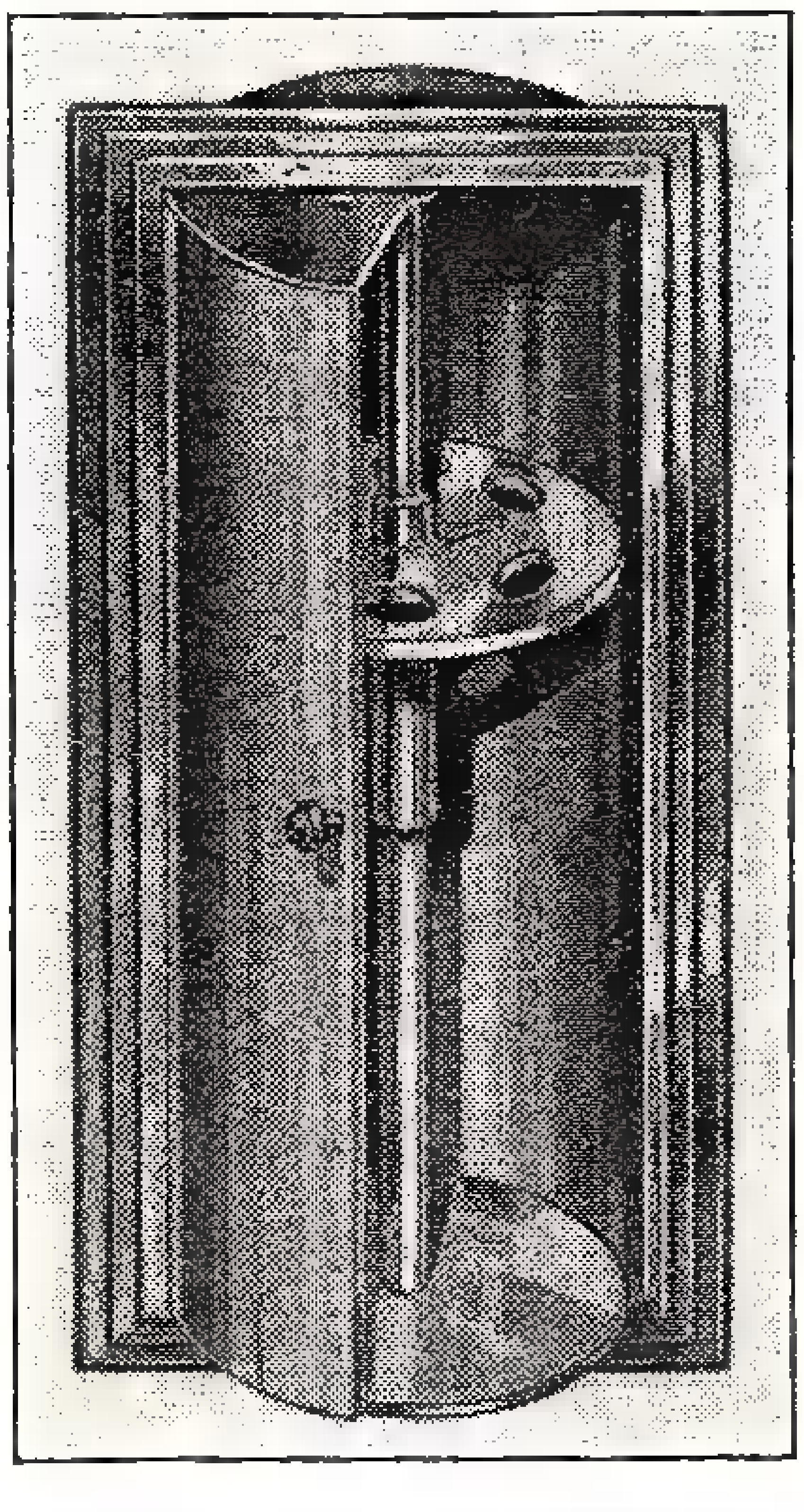
New Cigaret Roller Fits Pocket



This new cigaret roller is small enough to fit the pocket, and is said to deliver perfectly rolled smokes instantly.

NEWEST of the smoking accessories is a cigaret roller small enough to be carried in the pocket. With the hinged lid open the cigaret paper is loaded with tobacco and the gummed edge moistened. The lid is then closed and the finished smoke appears in a slot in the top of the box almost immediately.

Brush Holder Revolves in Wall



Revolving toothbrush holder is flush with wall when not in use, protecting brushes from dirt.

AN ornament to any bathroom is a revolving toothbrush holder which is placed in a recess flush with the wall.

The device consists of a metal cylinder cut away on its inner side but which presents an unbroken surface when brushes are turned inward.

Brushes are held in a perforated disk of the conventional type which rotates independently of the revolving door.

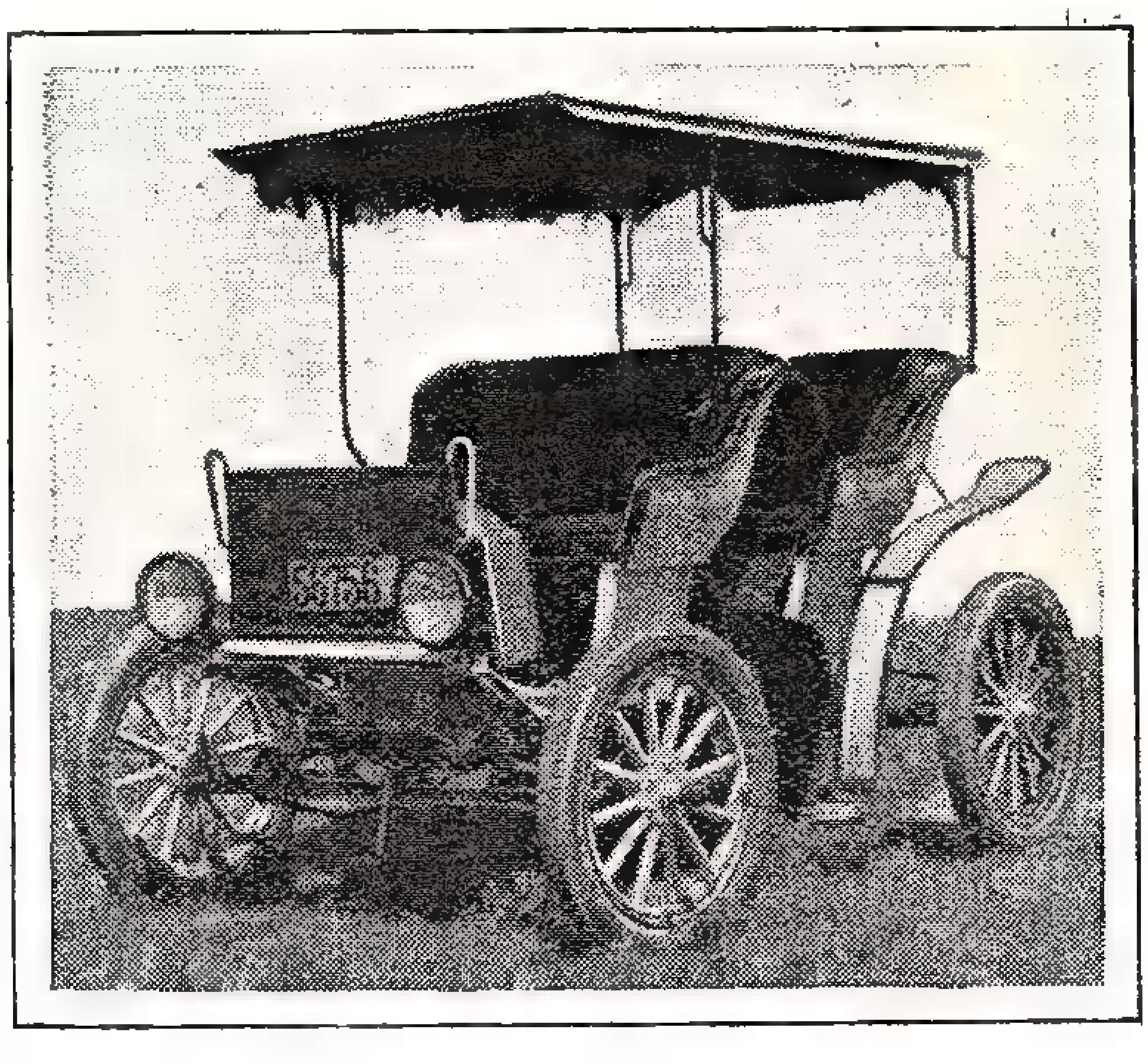
Open Air Ford Has Back Seat Drive

WITH the completion of a weird auto-buggy by home mechanics near Livermore, California, the back seat driver comes definitely into his own. For the strange vehicle, which looks like a buggy and runs like an automobile, is operated solely from the back seat.

High seats, carriage fenders and a fringed surrey top complete the buggy illusion. The car's radiator is partly hidden by a buggy dashboard.

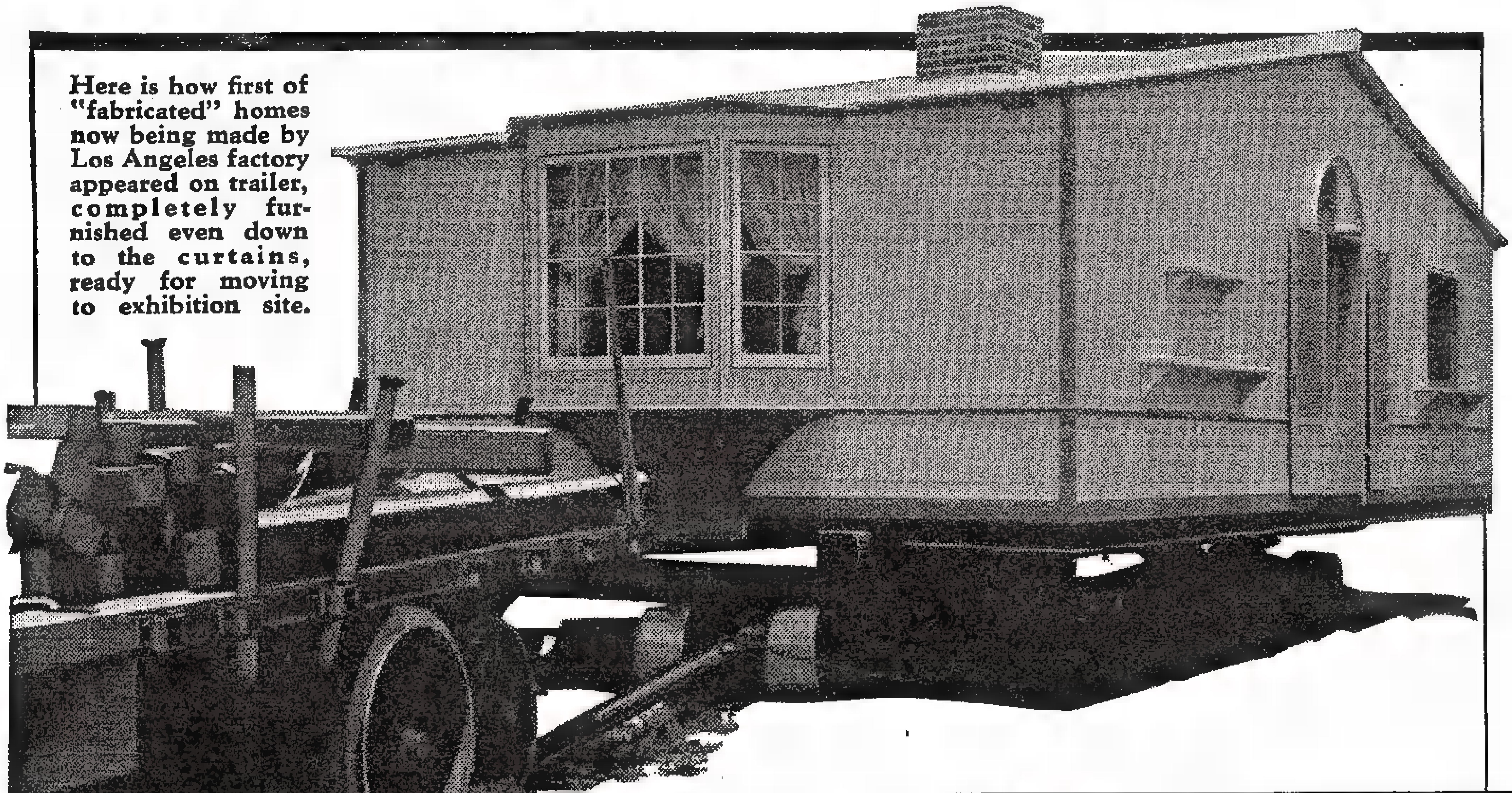
Fresh air in quantities sweeps in around the open sides of the curious equipage, which is powered by a 1926 model T engine. Ample space is provided for five passengers.

The auto-buggy has a cruising speed of about 40 m.p.h. and idles down to five. Built solely as a novelty project in a home workshop, the entire construction costs amounted only to fifty dollars.

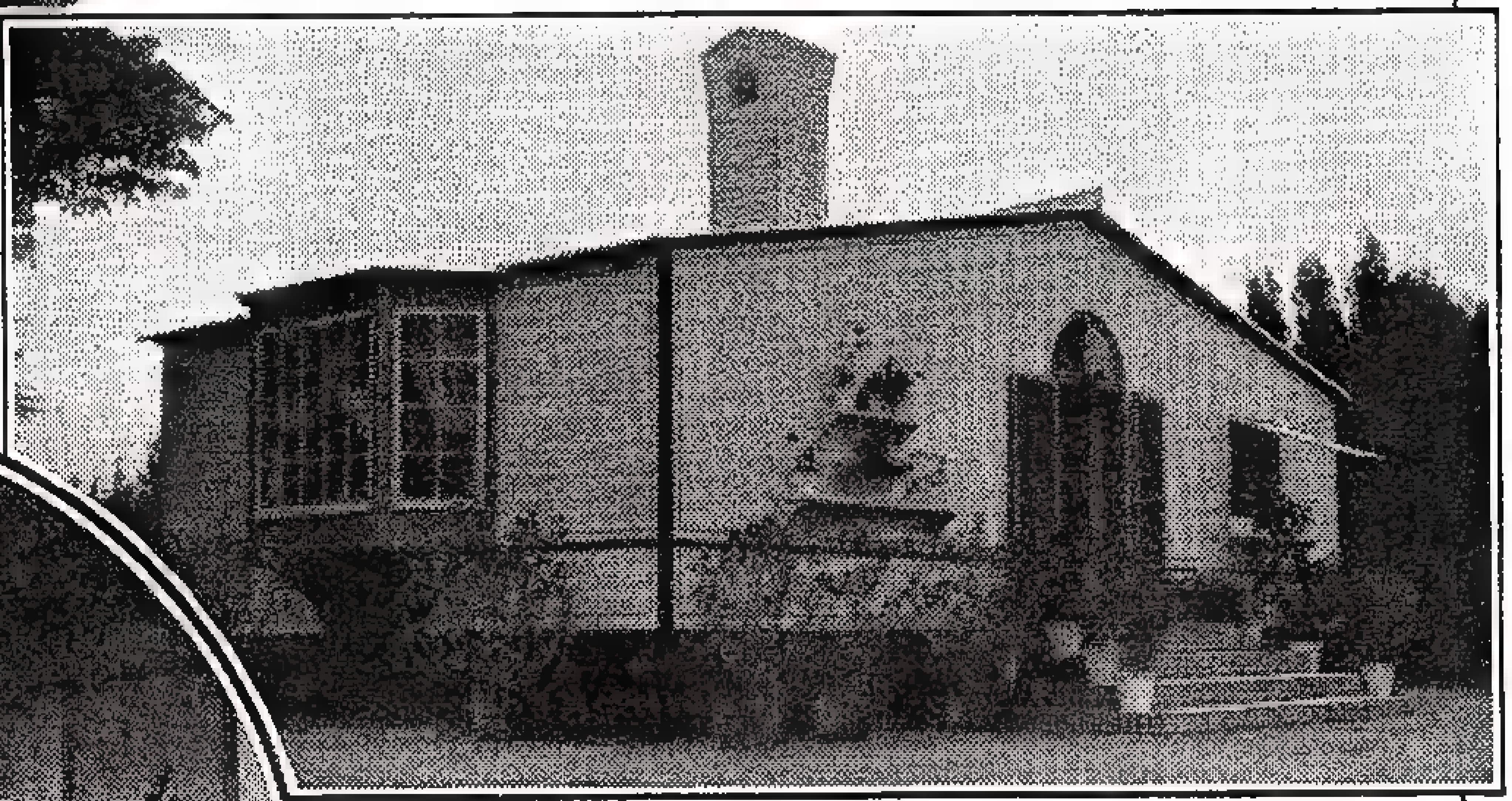


This open air Ford is powered by a 1926 model T engine and is a familiar sight in the Bay region near San Francisco. The car cruises at 40 m.p.h. and was built for $50.

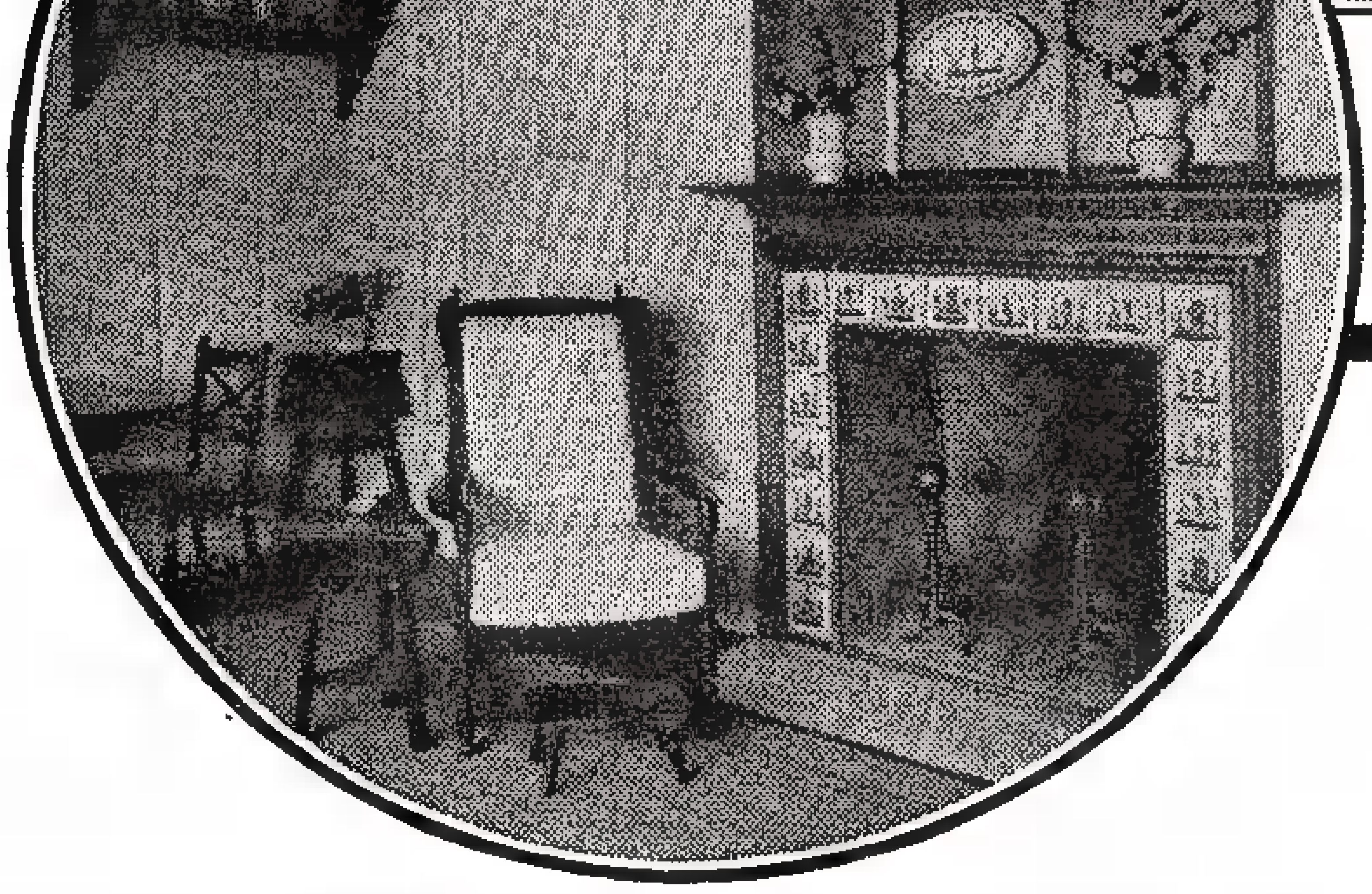
Factory-Built Homes Shipped by Truck



Here is how first of "fabricated" homes now being made by Los Angeles factory appeared on trailer, completely furnished even down to the curtains, ready for moving to exhibition site.



This one-bedroom cottage, selling for $2,750, can be delivered and set up ready for occupancy in three days. Additional rooms costing about $200 each can be added as desired. Being entirely of wood, building will withstand earthquakes or moving to new site at any time.



If desired, living room is completely furnished as shown before leaving factory. Ceiling has natural wood finish.

ARE you in the market for a home? Just step into Los Angeles' unique house-building factory, select yours from the stock of completely furnished homes already on hand, and make the small down payment. In three days' time the house will have been hauled out to your lot by truck, set up on foundations, and connected to electric, telephone, gas, water, and sewer lines—in three days your home will be ready!

The first "fabricated" house, christened "Honeymoon Cottage" by Mary Pickford, is now on exhibition on Wilshire Boulevard, Los Angeles. It was built complete at the factory, with plumbing, hardware, and furniture all in place, and hauled to its site on a truck trailer at a speed of 12 m.p.h.

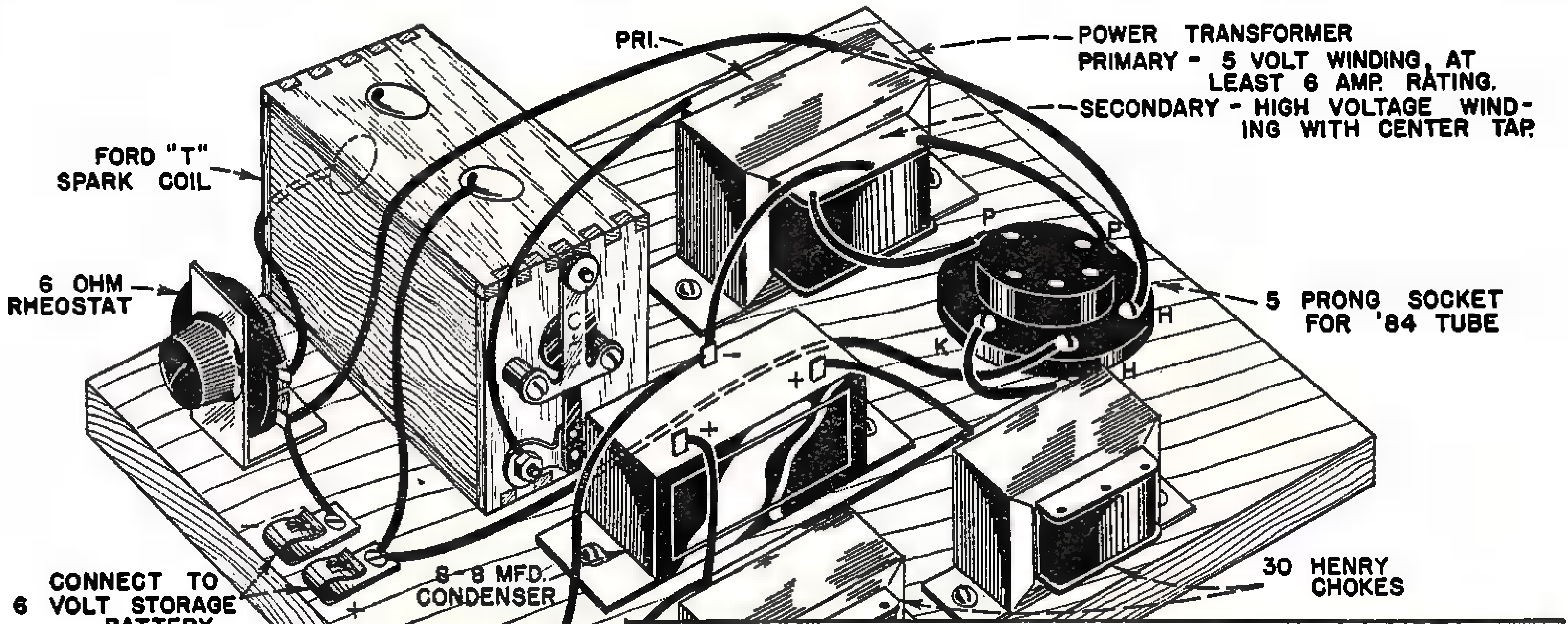
These houses are designed to permit the addition of extra rooms at any time. An extra bedroom, costing around $200, can be fitted to the home in a day or two.

Built to withstand storm and earthquake shock, as well as the strains set up by moving, the houses are constructed entirely of California redwood, with knotty California pine instead of plaster on the walls.

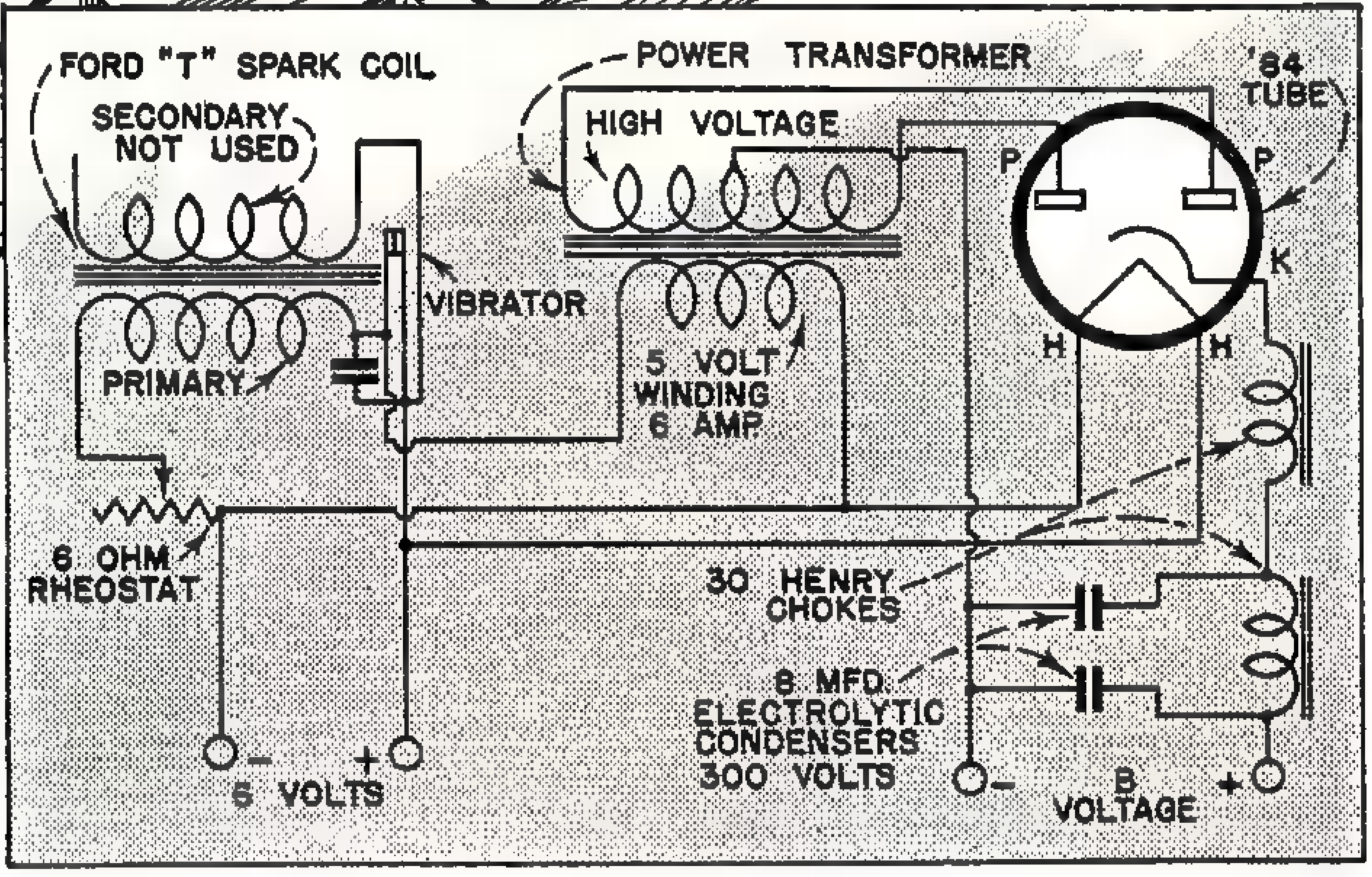
There is another advantage to these factory-built homes. In case you want to move, the factory sends out a few service men, who jack up the house onto a trailer and move it, furniture and all, to a new site anywhere in the country.

RADIO SPARKS

Spark Coil 'B' Power Supply Operates From 6-V. Battery


PRI.
POWER TRANSFORMER
PRIMARY - 5 VOLT WINDING, AT LEAST 6 AMP. RATING.
SECONDARY - HIGH VOLTAGE WINDING WITH CENTER TAP.
FORD "T" SPARK COIL
6 OHM RHEOSTAT
P
P
H
K
H
5 PRONG SOCKET FOR '84 TUBE
CONNECT TO 6 VOLT STORAGE BATTERY
8-8 MFD. CONDENSER
30 HENRY CHOKES
"B" VOLTAGE
+
-

Suggested arrangement of parts for power supply unit. Adjust rheostat and contact points until unit is delivering maximum output. Old audio transformers may be used for filter chokes by placing coils in series.


FORD "T" SPARK COIL
SECONDARY NOT USED
PRIMARY
VIBRATOR
POWER TRANSFORMER
HIGH VOLTAGE
5 VOLT WINDING 6 AMP.
'84 TUBE
P
P
K
H
H
6 OHM RHEOSTAT
30 HENRY CHOKES
8 MFD. ELECTROLYTIC CONDENSERS 300 VOLTS
− + 6 VOLTS
− B VOLTAGE +

Circuit diagram for vibrator type power supply delivering up to 200 volts.

FOR short wave sets, portable camp receivers, small transmitters, and other low power radio apparatus requiring less than 200 volts this spark coil power supply will be found useful. Operating directly from a 6-volt auto storage battery, it will deliver a practically pure direct current when properly adjusted and filtered. The output will compare favorably with that of the vibrating power supplies used on many car radios.

Get a standard Ford T spark coil; replacement coils often are wound differently and would not work in this circuit. Other parts generally can be found in the radio scrap box; the power transformer should have a 5-volt winding capable of carrying at least 6 amperes, and a center-tapped high voltage winding wound for 600 volts each side of the tap. The turns ratio for the transformer must be at least 7 turns per volt; otherwise the current will be too great and vibrator points will be ruined quickly.

Make all connections exactly as indicated in the sketches, soldering each joint carefully. Mount the entire unit in a wood box, making it as sound proof as possible.

Adjust the vibrator contacts until they give off a high-pitched note, and test with a voltmeter to determine if this is giving the highest output. Keep the vibrator points clean, removing pits and irregularities occasionally with a fine emery stone.

Separate wires should always be run from the storage battery to the filaments of tubes in the radio set, to prevent any pickup which may make the set noisy.

Talk on 5 METER WAVES

Hold phone conversations with friends on lakes, at camp, or in the city, as far as ten miles away, with this compact but powerful ultra-short wave combined transmitter and receiver.

ONLY a few years ago radio transmission on the five meter band was a rare thing. Today ultra-short wave sets are giving hundreds of fans a chance to operate their own transmitters and enjoy the thrills of amateur radio without putting out hundreds of dollars for equipment.

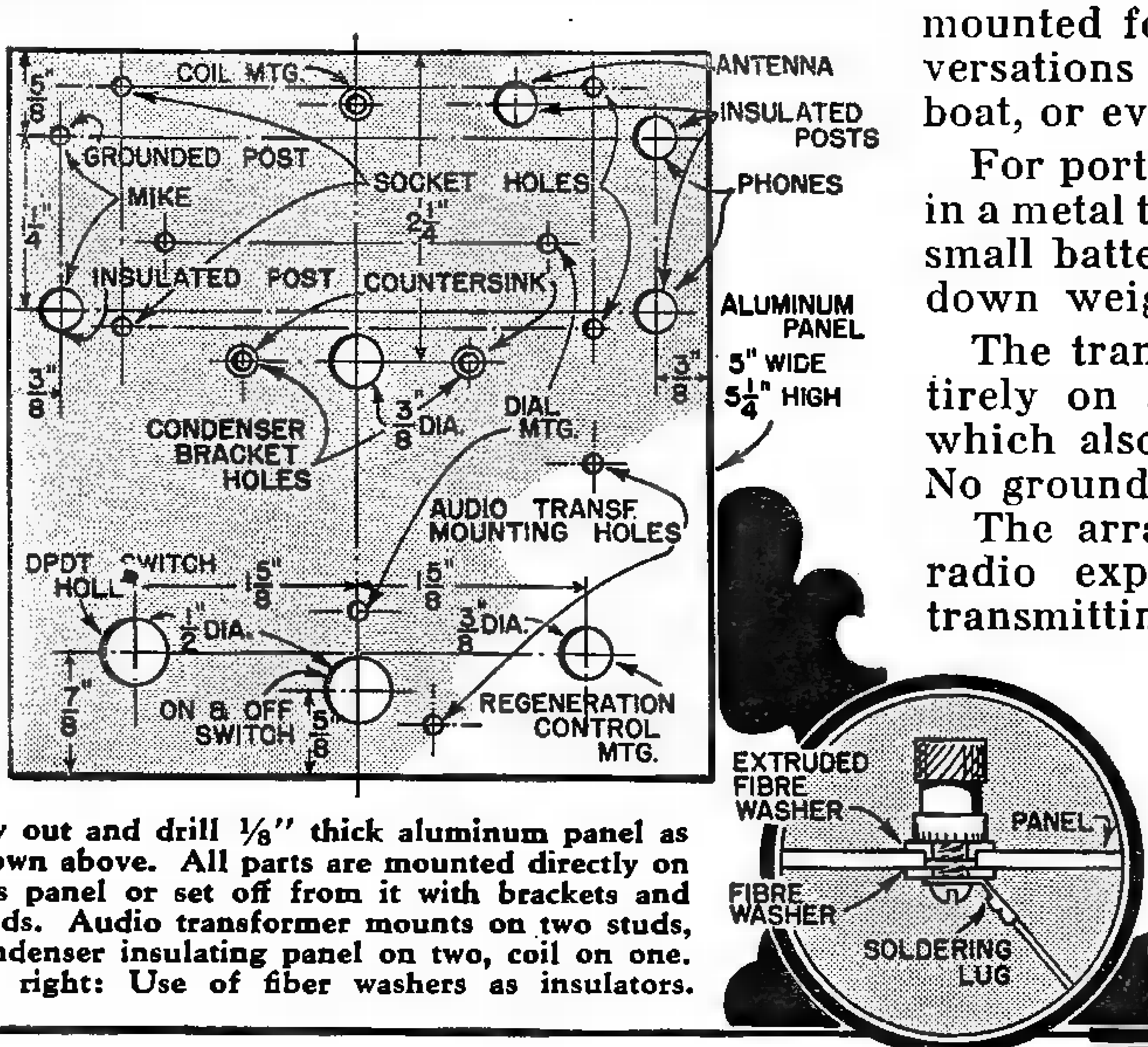
Designed especially for MODERN MECHANIX AND INVENTIONS readers, this 5-meter combination transmitter and receiver can be built from standard parts for about $5. Many fans will be able to salvage parts from old battery receivers. The tubes, batteries, headphone set, and carbon microphone complete the setup.

Actually we have here a private telephone system, with a range up to ten miles. With one set at home or camp, and another mounted for portable use, telephonic conversations can be carried on from your car, boat, or even while hiking.

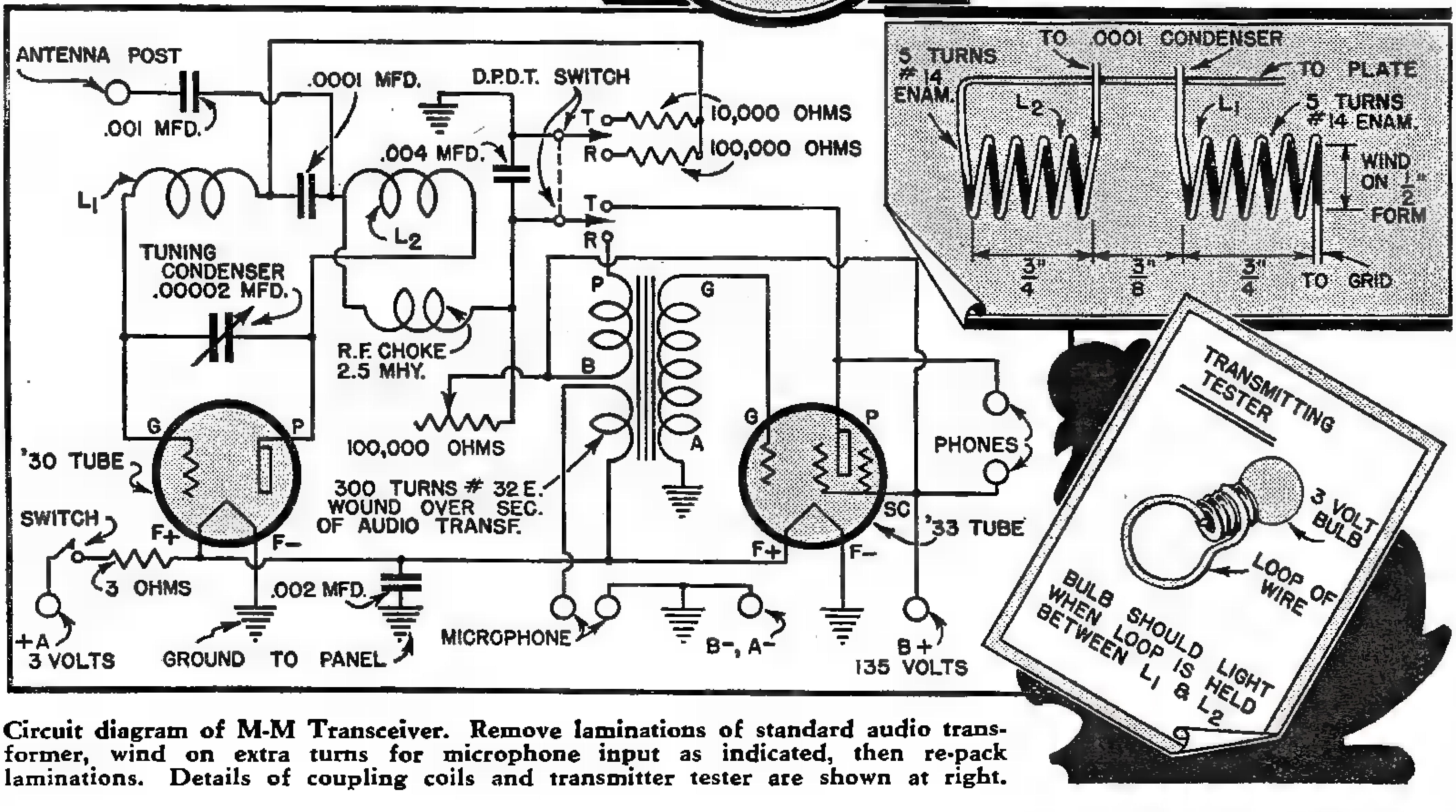
For portable use the set may be mounted in a metal tool box or overnight bag. Special small batteries should then be used to cut down weight.

The transmitter-receiver is mounted entirely on an aluminum panel 5¼" x 5", which also serves as chassis and ground. No ground wire is used.

The arrangement of parts is novel, but radio experimenters will recognize the transmitting unit as a split Colpitts circuit modulated by a '33 pentode. With the switch thrown for receiving, the '33 tube becomes a stage of audio frequency and the transmitter a receiver operating very much like a super-regenerative set.


COIL MTG.
ANTENNA
INSULATED POSTS
PHONES
GROUNDED POST
MIKE
SOCKET HOLES 2¼"
INSULATED POST
COUNTERSINK
ALUMINUM PANEL 5" WIDE 5¼" HIGH
CONDENSER BRACKET HOLES
⅜" DIA.
DIAL MTG.
AUDIO TRANSF. MOUNTING HOLES
DPDT SWITCH HOLE
½" DIA.
⅜" DIA.
ON & OFF SWITCH
REGENERATION CONTROL MTG.
5/8"
1/4"
3/8"
7/8"
EXTRUDED FIBRE WASHER
PANEL
FIBRE WASHER
SOLDERING LUG

Lay out and drill ⅛" thick aluminum panel as shown above. All parts are mounted directly on this panel or set off from it with brackets and studs. Audio transformer mounts on two studs, condenser insulating panel on two, coil on one. At right: Use of fiber washers as insulators.


ANTENNA POST
.001 MFD.
.0001 MFD.
D.P.D.T. SWITCH
10,000 OHMS
100,000 OHMS
.004 MFD.
T
R
L1
L2
TUNING CONDENSER .00002 MFD.
R.F. CHOKE 2.5 MHY.
P
G
B
A
100,000 OHMS
300 TURNS # 32 E. WOUND OVER SEC. OF AUDIO TRANSF.
'30 TUBE
SWITCH
F+
F–
3 OHMS
.002 MFD.
+A 3 VOLTS
GROUND TO PANEL
MICROPHONE
B–, A–
B+ 135 VOLTS
PHONES
SC
'33 TUBE
5 TURNS #14 ENAM.
TO .0001 CONDENSER
TO PLATE
5 TURNS #14 ENAM.
WIND ON ½" FORM
¾"
⅜"
¾"
TO GRID
TRANSMITTING TESTER
3 VOLT BULB
LOOP OF WIRE
BULB SHOULD LIGHT WHEN LOOP IS HELD BETWEEN L1 & L2

Circuit diagram of M-M Transceiver. Remove laminations of standard audio transformer, wind on extra turns for microphone input as indicated, then re-pack laminations. Details of coupling coils and transmitter tester are shown at right.

with M-M TRANSMITTER

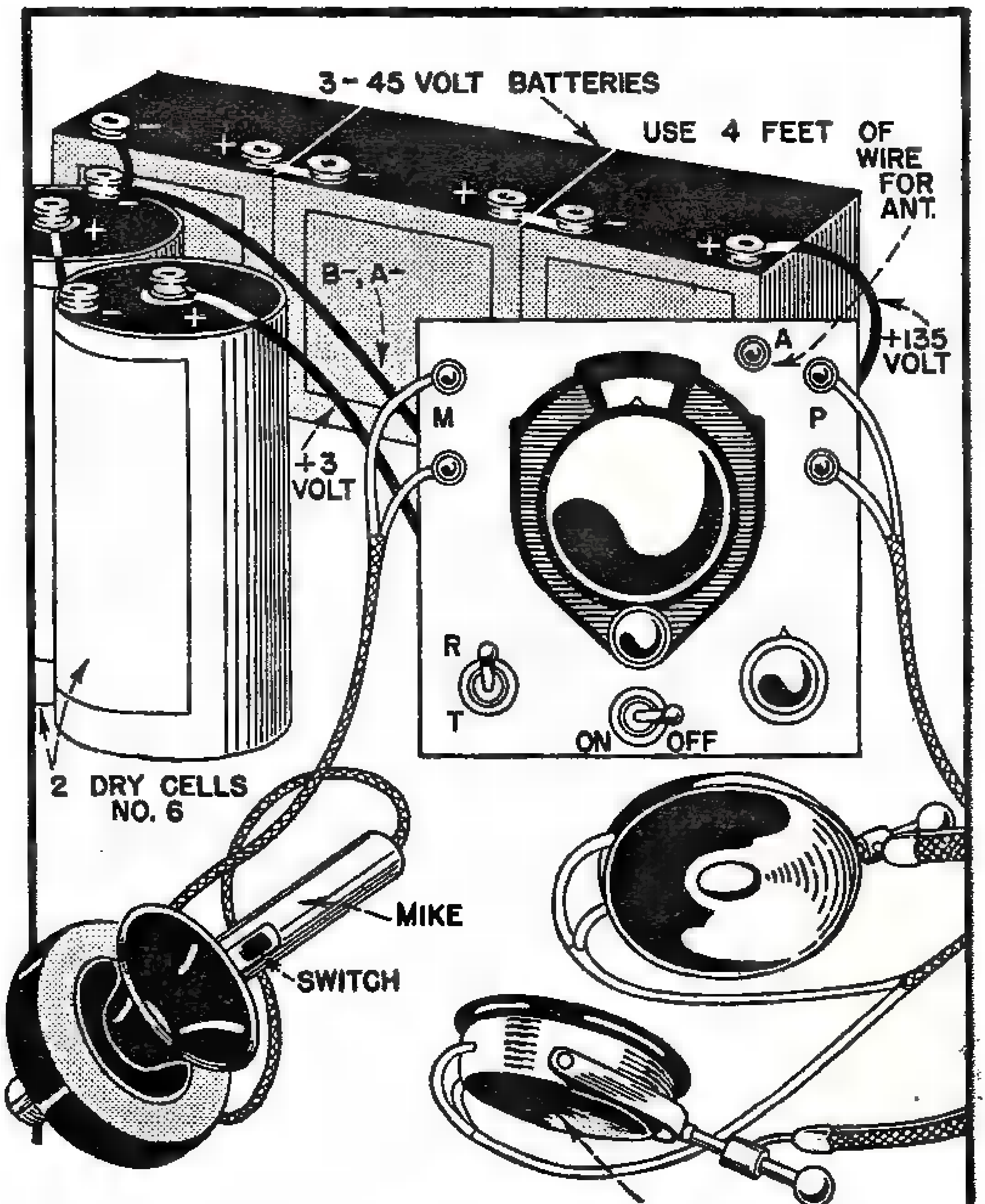
by THOMAS A. BLANCHARD

Microphone and audio transformers have been combined to save space by winding between 250 and 300 turns of No. 32 enameled copper wire over the secondary winding of an ordinary audio frequency transformer. If desired, a manufactured transformer serving exactly the same purpose can be had for around one dollar.

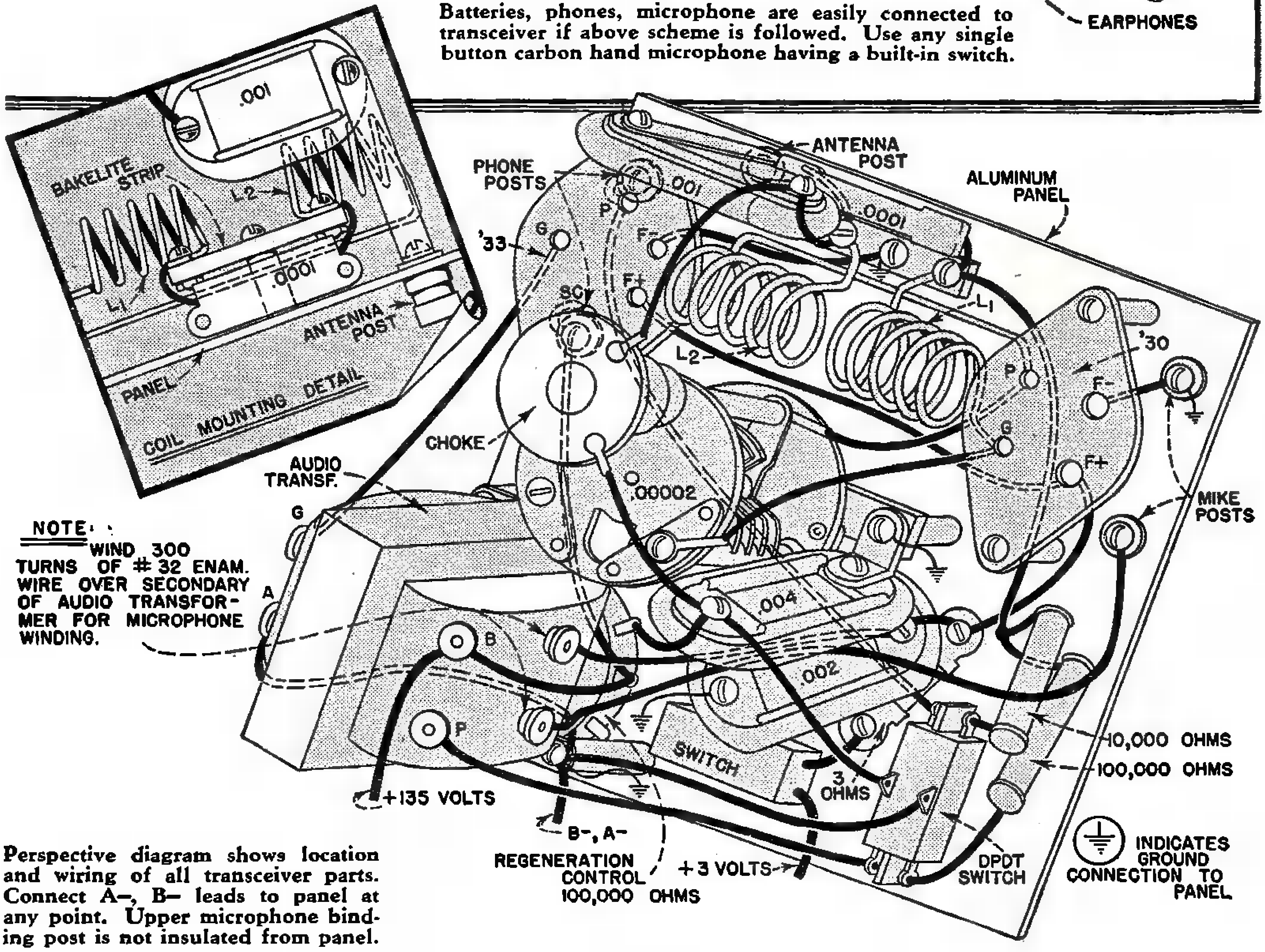
The transformer and tube sockets are mounted on metal or fiber studs to eliminate body capacity. The small tuning condenser is mounted on a strip of bakelite which in turn is held away from the panel by studs. This condenser should be no larger than 20 mmf. (.00002) in order that the set will tune down low enough; this size generally will have seven plates. Sockets are of the wafer type, mounted as shown, with the coils located between.

The coils are wound with No. 14 or No. 12 plain or enameled copper wire. Both coils have 5 turns wound on a ½″ dowel or pipe form. When removed from the form the coils will open slightly, giving the correct finished inside diameter of about ⅝″. Spread out the windings to leave about ⅛″ space between each turn.

(Continued on page 122)

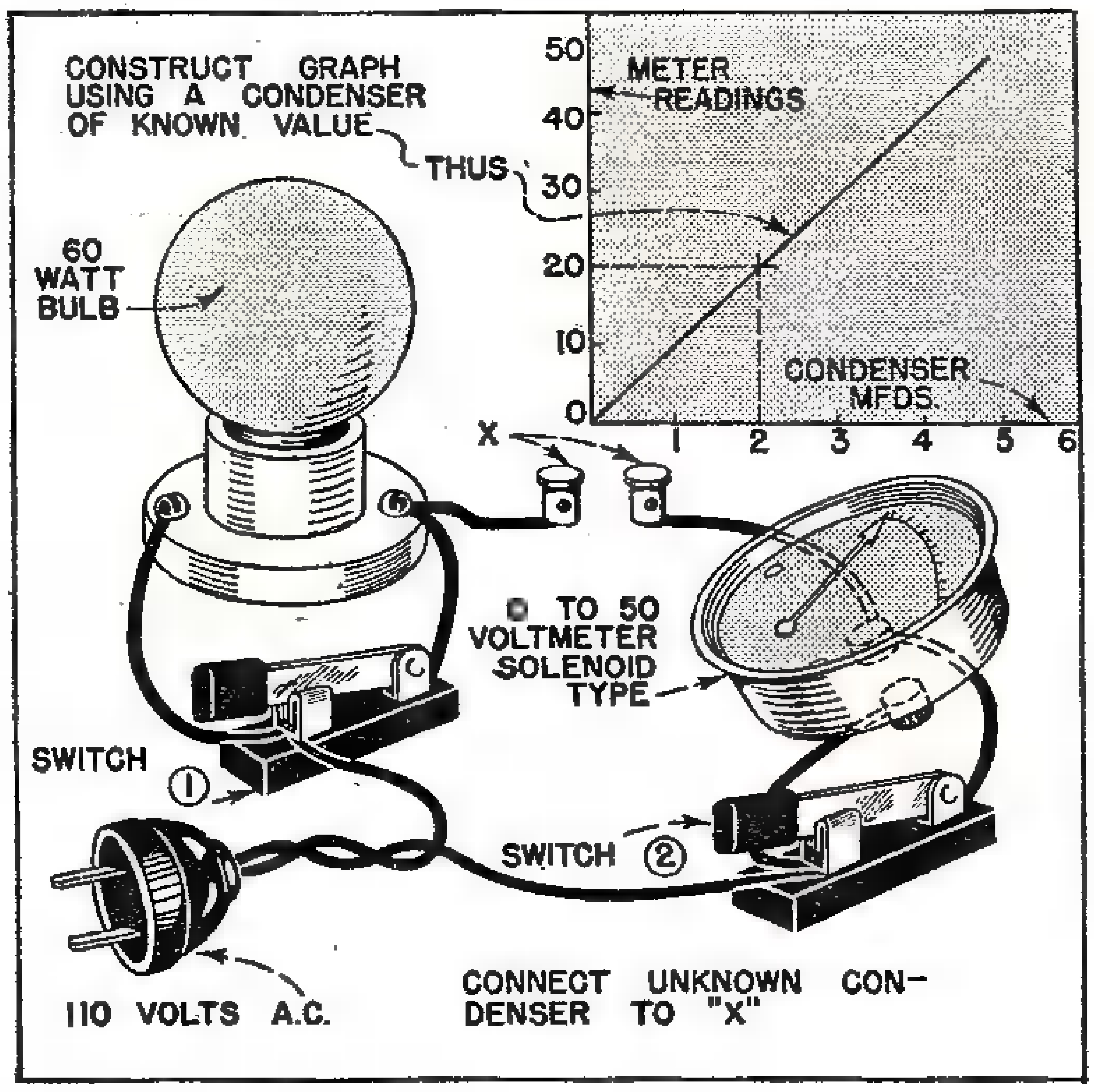

3-45 VOLT BATTERIES
USE 4 FEET OF WIRE FOR ANT.
B-, A-
+135 VOLT
A
M
P
+3 VOLT
R
T
ON
OFF
2 DRY CELLS NO. 6
MIKE
SWITCH
EARPHONES

Batteries, phones, microphone are easily connected to transceiver if above scheme is followed. Use any single button carbon hand microphone having a built-in switch.


.001
BAKELITE STRIP
L2
L1
.0001
ANTENNA POST
PANEL
COIL MOUNTING DETAIL
PHONE POSTS
P
'33
G
F-
F+
SC
.001
ANTENNA POST
.0001
ALUMINUM PANEL
L1
L2
'30
P
F-
G
F+
CHOKE
AUDIO TRANSF.
.00002
MIKE POSTS
G
NOTE: WIND 300 TURNS OF #32 ENAM. WIRE OVER SECONDARY OF AUDIO TRANSFORMER FOR MICROPHONE WINDING.
A
B
.004
.002
P
SWITCH
3 OHMS
10,000 OHMS
100,000 OHMS
+135 VOLTS
B-, A-
REGENERATION CONTROL 100,000 OHMS
+3 VOLTS
DPDT SWITCH
INDICATES GROUND CONNECTION TO PANEL

Perspective diagram shows location and wiring of all transceiver parts. Connect A–, B– leads to panel at any point. Upper microphone binding post is not insulated from panel.

Ordinary Voltmeter Measures Filter Condenser Capacities


CONSTRUCT GRAPH USING A CONDENSER OF KNOWN VALUE
THUS
METER READINGS
50
40
30
20
10
0
1
2
3
4
5
6
CONDENSER MFDS.
60 WATT BULB
X
0 TO 50 VOLTMETER SOLENOID TYPE
SWITCH ①
SWITCH ②
110 VOLTS A.C.
CONNECT UNKNOWN CONDENSER TO "X"

Mount meter, bulb, and switches on test panel. Light bulb gives indication of condition of condenser; meter gives rating. Use 0-50 volt, solenoid type B-battery testing meter.

OPERATING directly from 110 volts, a.c., this simple circuit will test and measure quickly the capacity of radio filter condensers.

To calibrate the tester, connect a condenser of known capacity to the X posts, close switch 1, open switch 2, and observe the meter reading. Plot this reading on a graph, then draw a straight line through the point and the zero of the graph.

In testing unknown condensers, close switch 2 and open 1. If the bulb glows brightly, the condenser is shorted. If it remains dark, glows faintly, or flashes for an instant, open switch 2, close 1, and note the meter reading. Pick off the corresponding condenser rating from the graph.

Gadgets Make Wire-handling Easy

WHERE a multitude of bends are to be made in stiff wire, a bending jig will prove a time-saver. By hinging two hardwood blocks together, cutting a notch corresponding to the desired shape of bend in one, and a projection of the same shape on the other, an inexpensive but handy jig can be made. It will be found useful especially for bending bus-bar wire for radio sets.

Heavy wire is pulled taut readily if gripped with a holder made from an old auto brake rod. Run the wire through the loop, then wrap it two or three times around the shank.

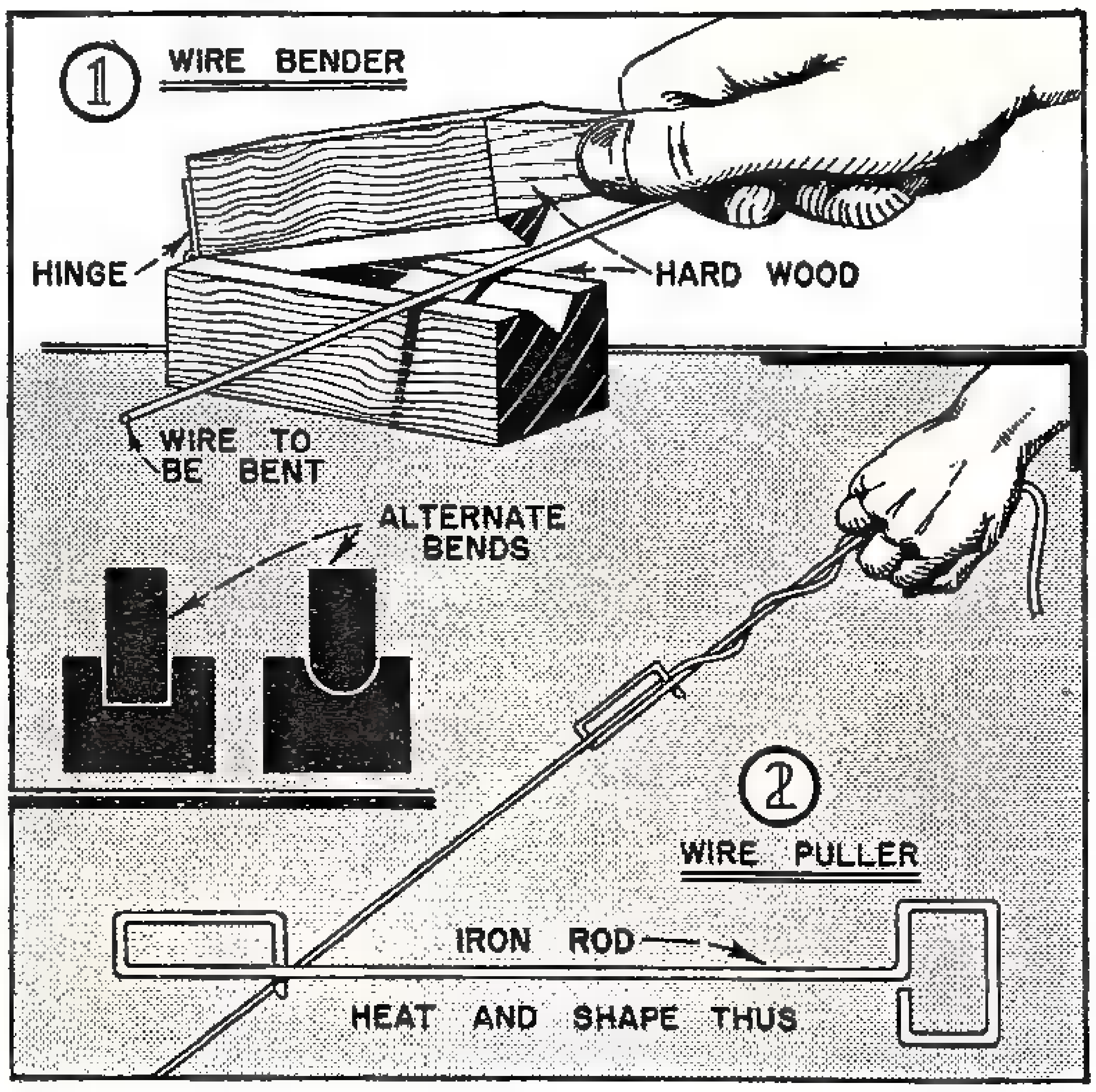
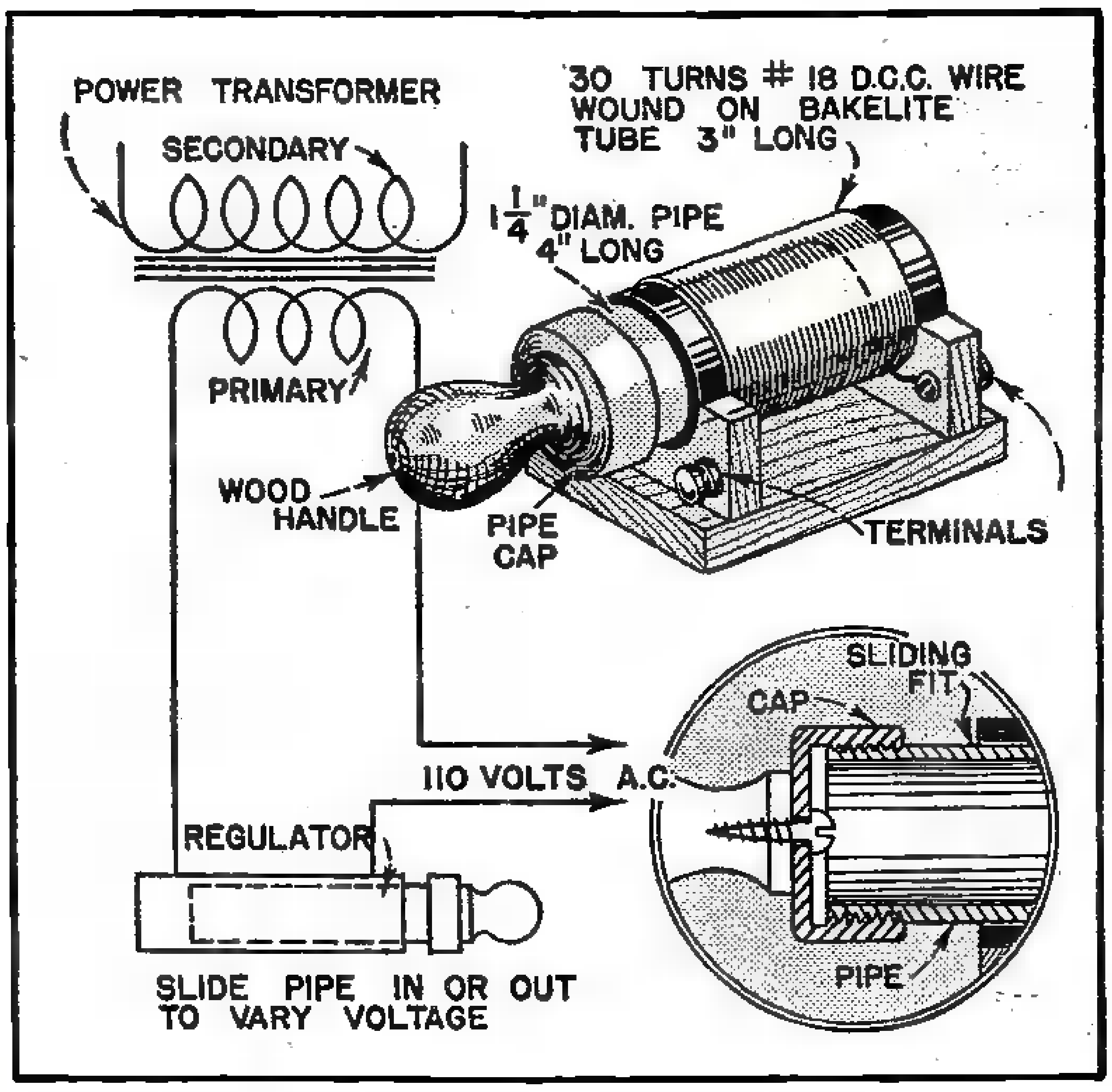

① WIRE BENDER
HINGE
HARD WOOD
WIRE TO BE BENT
ALTERNATE BENDS
② WIRE PULLER
IRON ROD
HEAT AND SHAPE THUS

Fig. 1 shows wire bender in use. Design is readily changed if other shape bends are wanted. Wire puller in Fig. 2 is forged from old auto brake rod; heat before bending.

Control Voltage Without Rheostat


POWER TRANSFORMER
SECONDARY
PRIMARY
30 TURNS # 18 D.C.C. WIRE WOUND ON BAKELITE TUBE 3" LONG
1¼" DIAM. PIPE 4" LONG
WOOD HANDLE
PIPE CAP
TERMINALS
110 VOLTS A.C.
REGULATOR
SLIDE PIPE IN OR OUT TO VARY VOLTAGE
SLIDING FIT
CAP
PIPE

This voltage regulator for filament transformers is mainly choke coil connected in series with transformer primary, with adjustable iron core to vary effective a.c. inductance.

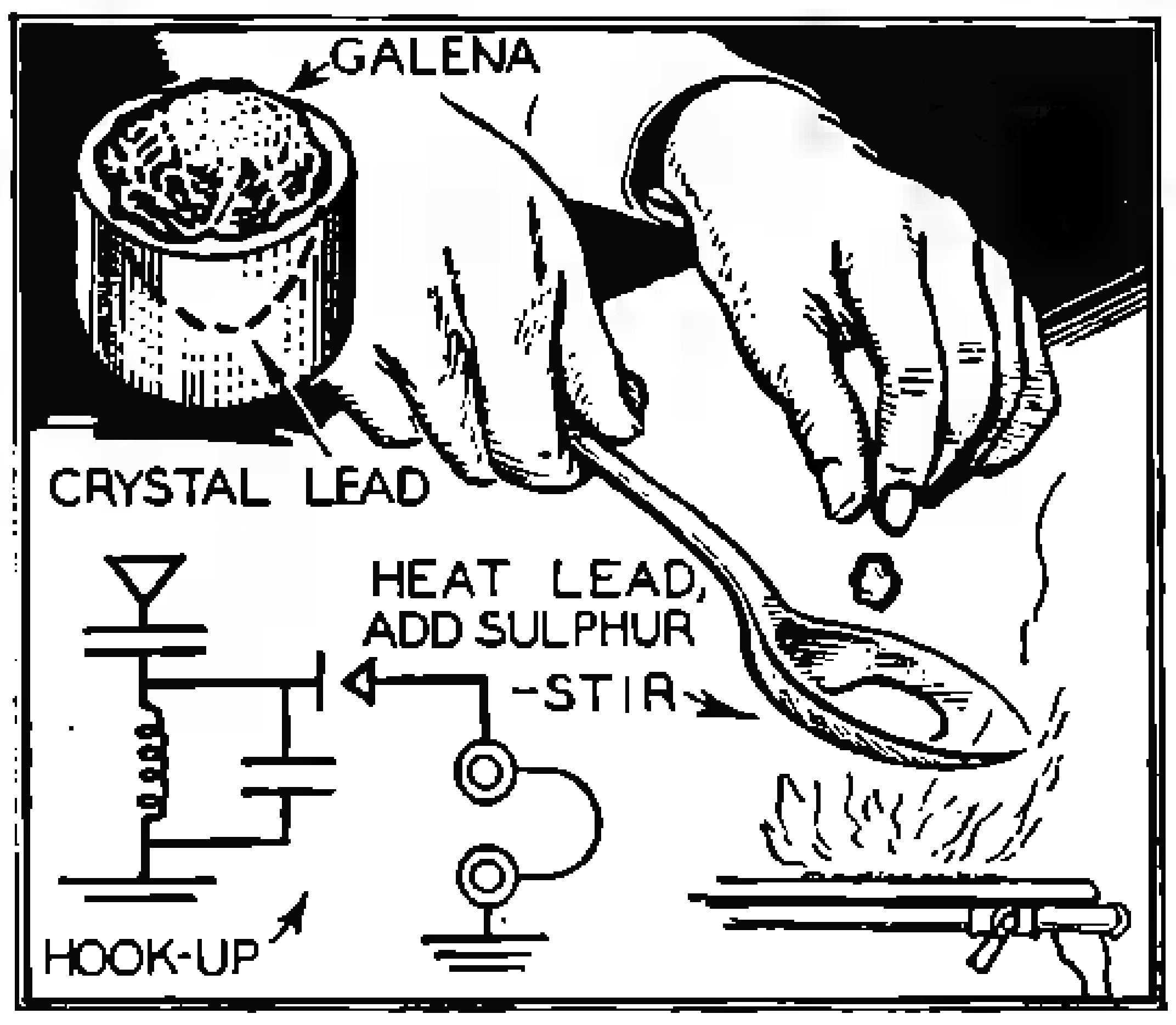
FILAMENT transformer voltages are lowered easily without a rheostat, by inserting this adjustable choke in series with the transformer primary. By changing the position of the plunger with relation to the coil, varying voltages can be obtained easily and quickly.

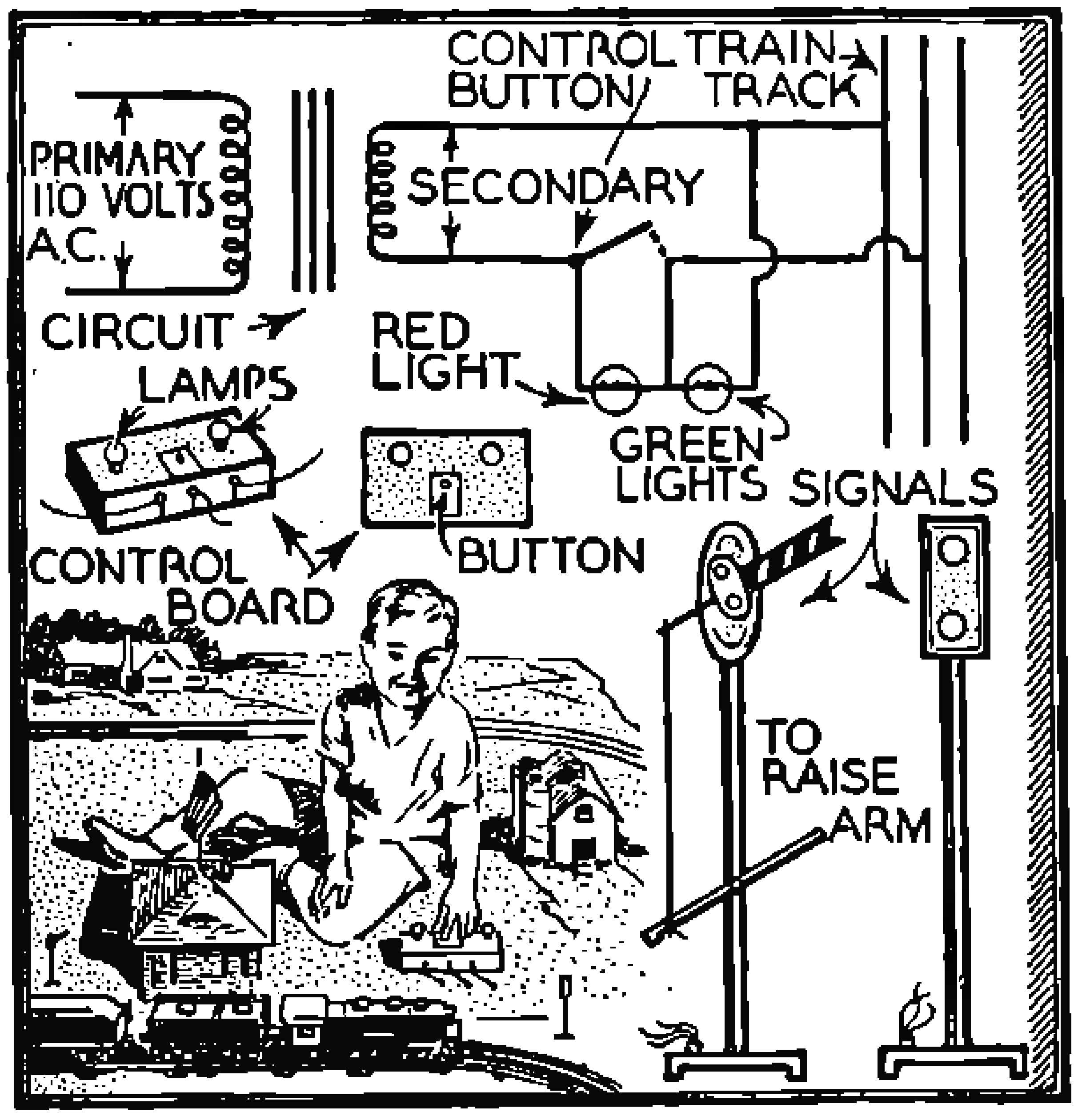
Wind 30 turns of No. 18 double cotton covered wire close together upon a length of 1½ inch diameter bakelite or cardboard tubing. Fasten the ends of the coil to binding posts mounted on a wood base made for the coil.

The plunger is a four inch length of iron pipe just large enough to slide inside the coil form. Force a wood handle into one end of the pipe, or bolt a handle to a pipe cap fitted over the end. The iron core changes the effective inductance of coil in proportion to distance it extends into coil.

Heat Lead and Sulphur to Make Radio Crystals

CRYSTALS of the galena type, used extensively a few years back for crystal radio receivers, can be made in a few minutes by radio experimenters. Only a small piece of lead and about a gram of sulphur are needed. Place a piece of lead about the size of a pea in an old teaspoon, heat until the lead melts, then add one gram of sulphur and stir the mixture with a piece of wire. Allow to cool, and use the resulting black metal exactly as you would a crystal.—C. K. Jones.


GALENA
CRYSTAL LEAD
HEAT LEAD, ADD SULPHUR
STIR
HOOK-UP

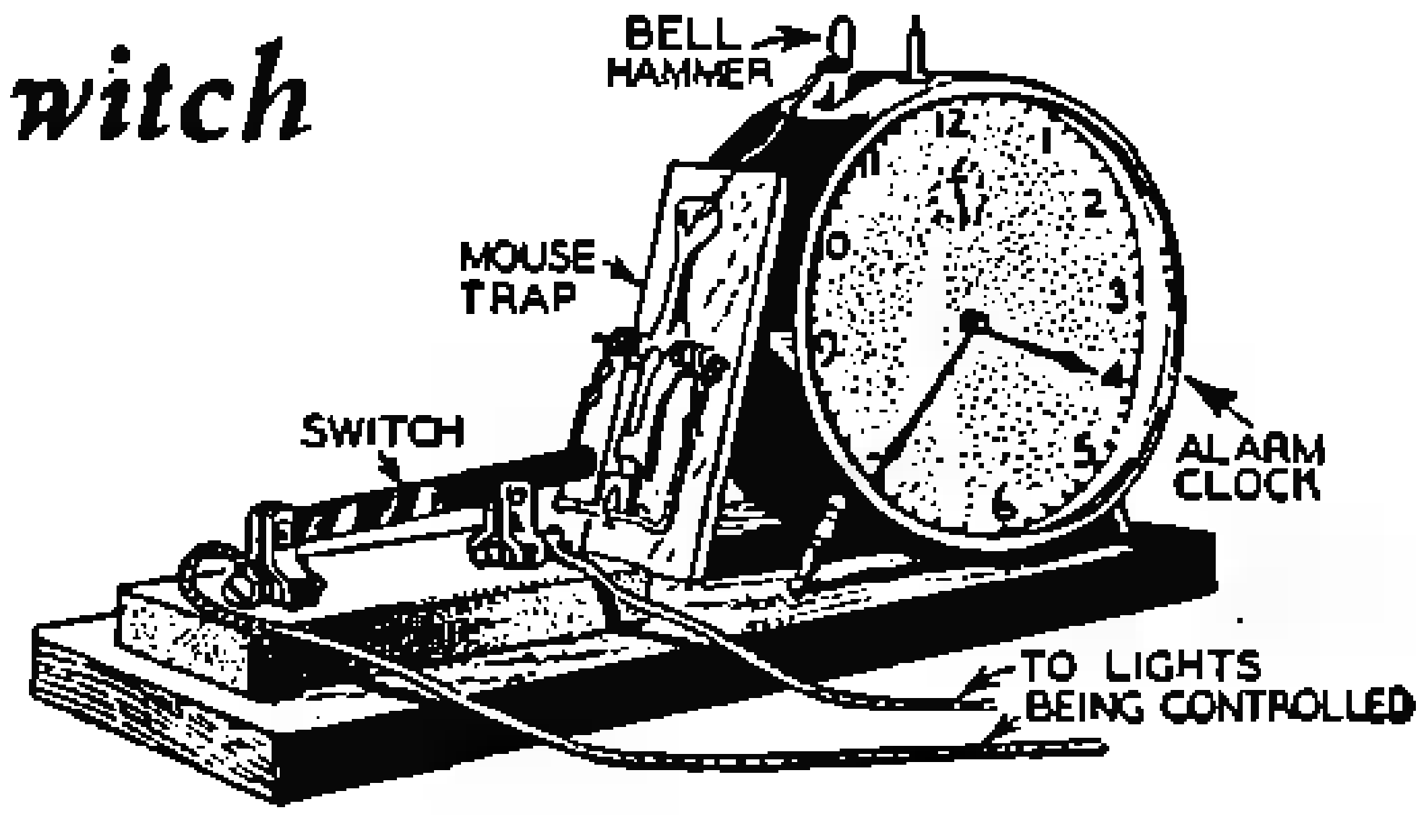

CONTROL BUTTON
TRAIN TRACK
PRIMARY 110 VOLTS A.C.
SECONDARY
CIRCUIT LAMPS
RED LIGHT
GREEN LIGHTS
SIGNALS
CONTROL BOARD
BUTTON
TO RAISE ARM

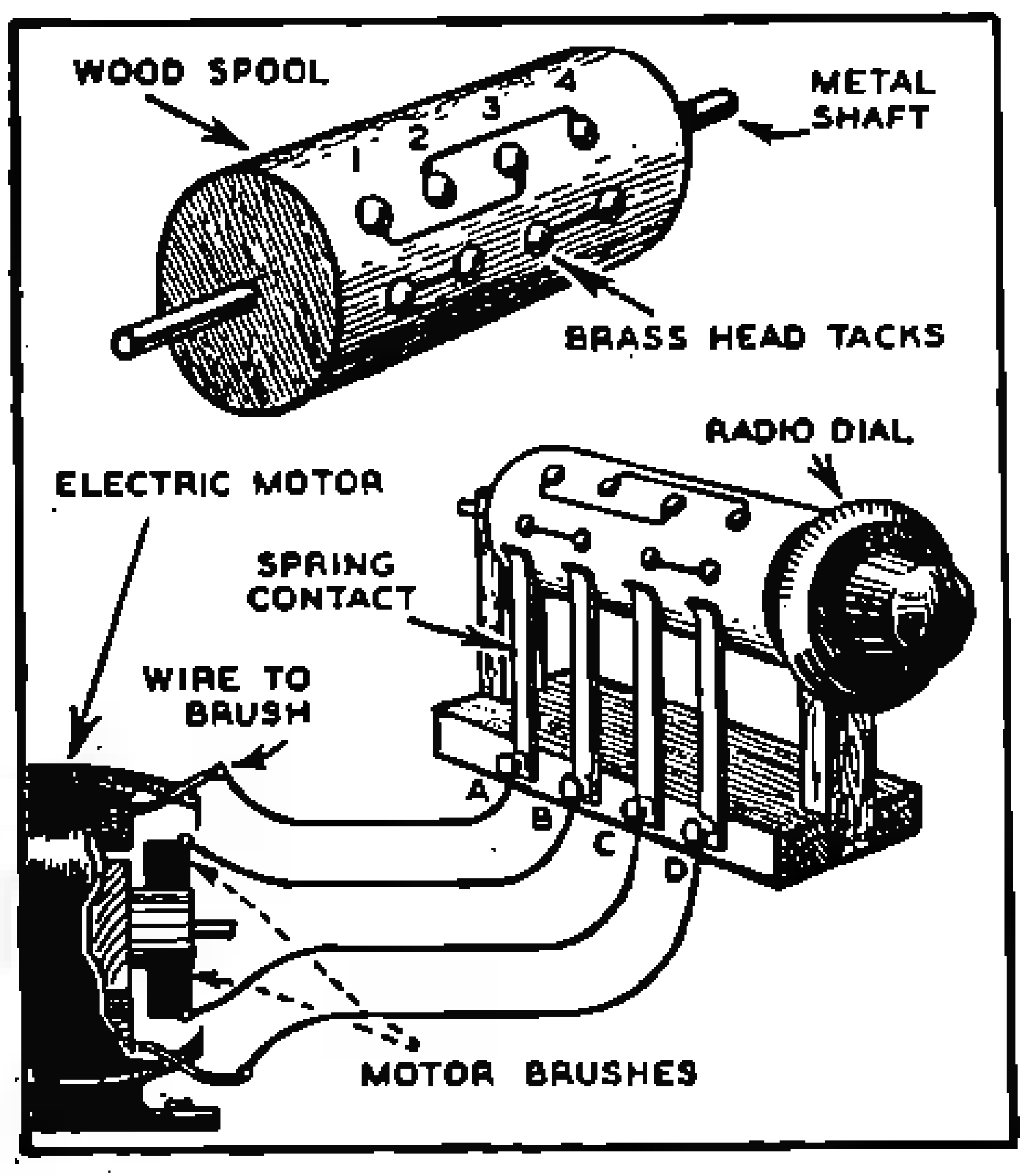
Automatic Signals for Toy Trains

WITH semaphore and track signals of your model railroad connected as shown in this circuit green lights will show when the train is running, red lights the instant the train is stopped. As many signal units as desired may be connected in parallel with this automatic control circuit. Connect all red lights across the control switch for your train—this is usually mounted on the transformer. All green lights connect between the center and one of the outer rails of the track. If desired, signal lights can also be mounted on the control board. Christmas tree lights work with most transformers.—Glenn G. Godwin.

Electric Time Switch

MADE with a 5-cent mouse-trap, a 20-cent knife switch, and a 60-cent alarm clock, this electric time switch will turn off signs, poultry house lights, or other electric circuits at any desired hour. The bell hammer on the alarm clock trips the mouse-trap trigger, which in turn flips open the switch.—Henry Westfall.


BELL HAMMER
MOUSE-TRAP
SWITCH
ALARM CLOCK
TO LIGHTS BEING CONTROLLED

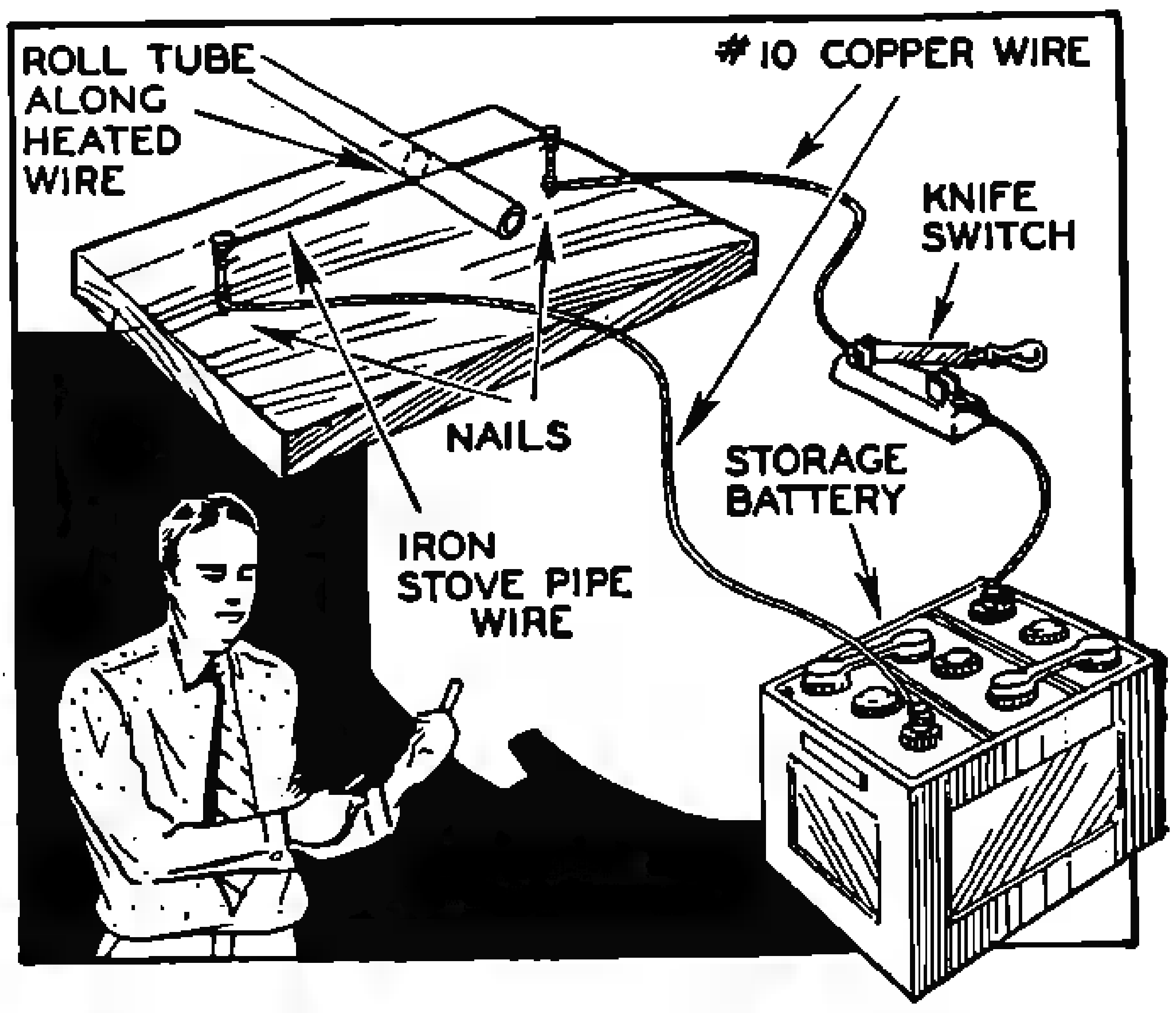

WOOD SPOOL
METAL SHAFT
1
2
3
4
BRASS HEAD TACKS
RADIO DIAL
ELECTRIC MOTOR
SPRING CONTACT
WIRE TO BRUSH
A
B
C
D
MOTOR BRUSHES

Reversing Switch for Small Battery Motors

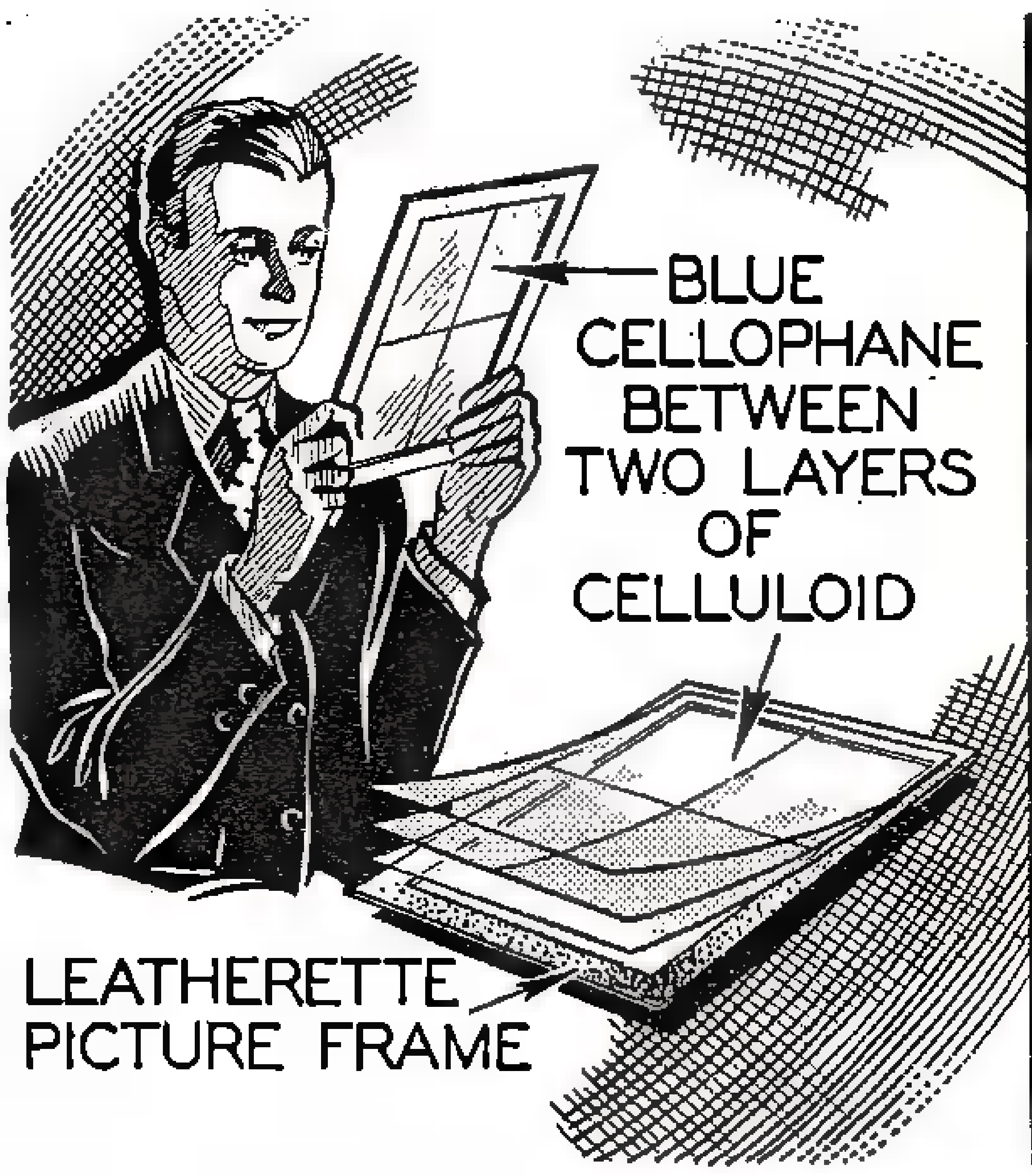
SUITABLE for reversing battery-operated toy trains and construction set motors, this polarity changing switch is easily made. Saw flanges off a large wooden spool, then drive a tight-fitting dowel through center. Mount spool on a wood base and attach a small radio dial. Now drive two rows of four brass headed tacks along length of cylinder, and connect pairs of tacks. Arrange four strips of spring brass on baseboard to contact tacks, and connect two to motor brushes, two to field coils. —L. B. Robbins.

Use Battery to Cut Glass

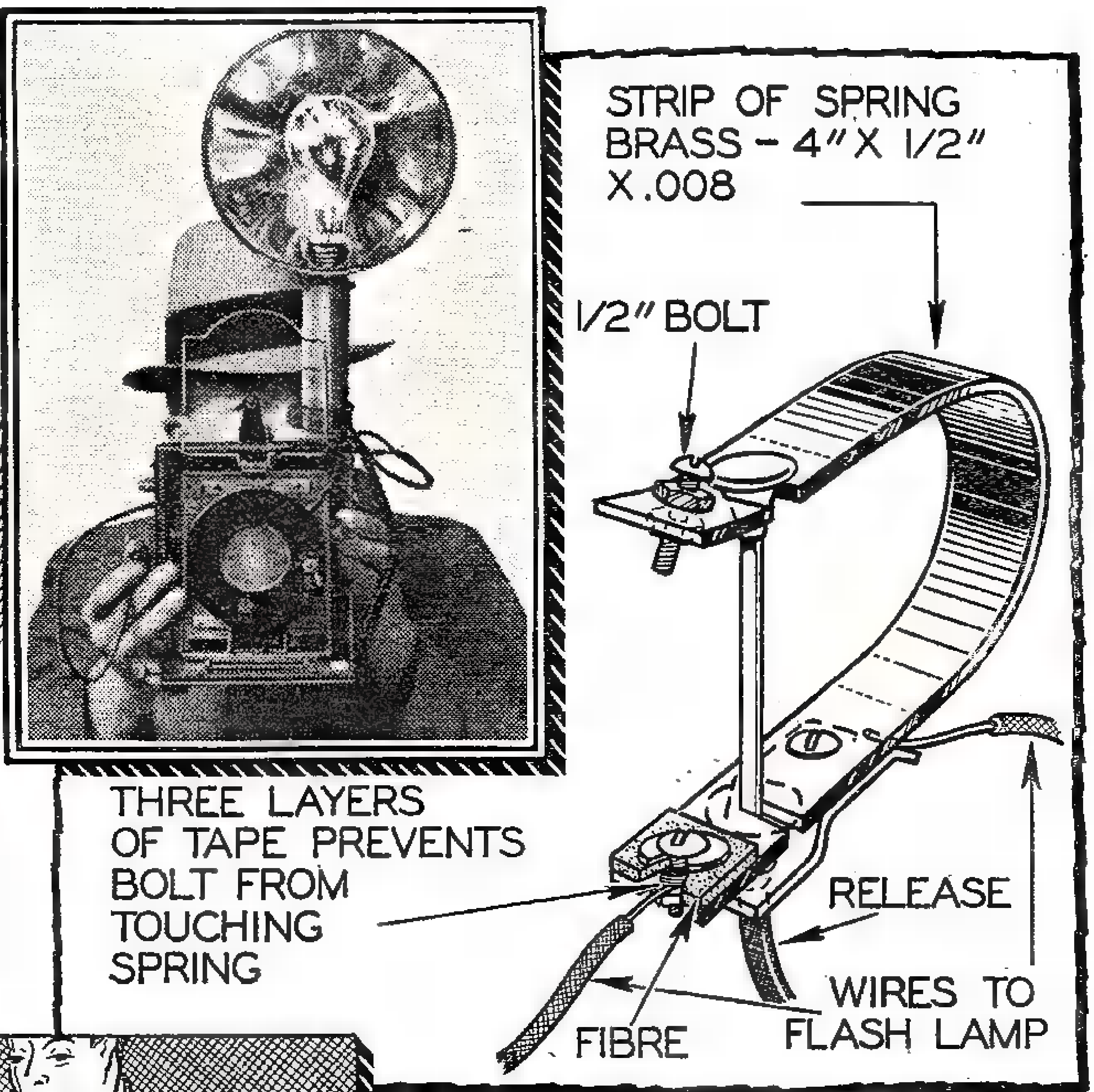
GLASS tubing can be cut easily and smoothly by rolling on a red-hot length of stovepipe wire stretched between two nails driven into a board. The wire is heated by running heavy copper leads from the nails to a storage battery. For convenience, a knife switch may be placed in series with the battery. With thick glass it is often necessary to start the cut with a file, or even put a few drops of water on the glass after it has been heated. If a 6 volt battery will melt the wire, then use either 2 or 4 volts.—R. F. Jennings.


ROLL TUBE ALONG HEATED WIRE
#10 COPPER WIRE
KNIFE SWITCH
NAILS
STORAGE BATTERY
IRON STOVE PIPE WIRE

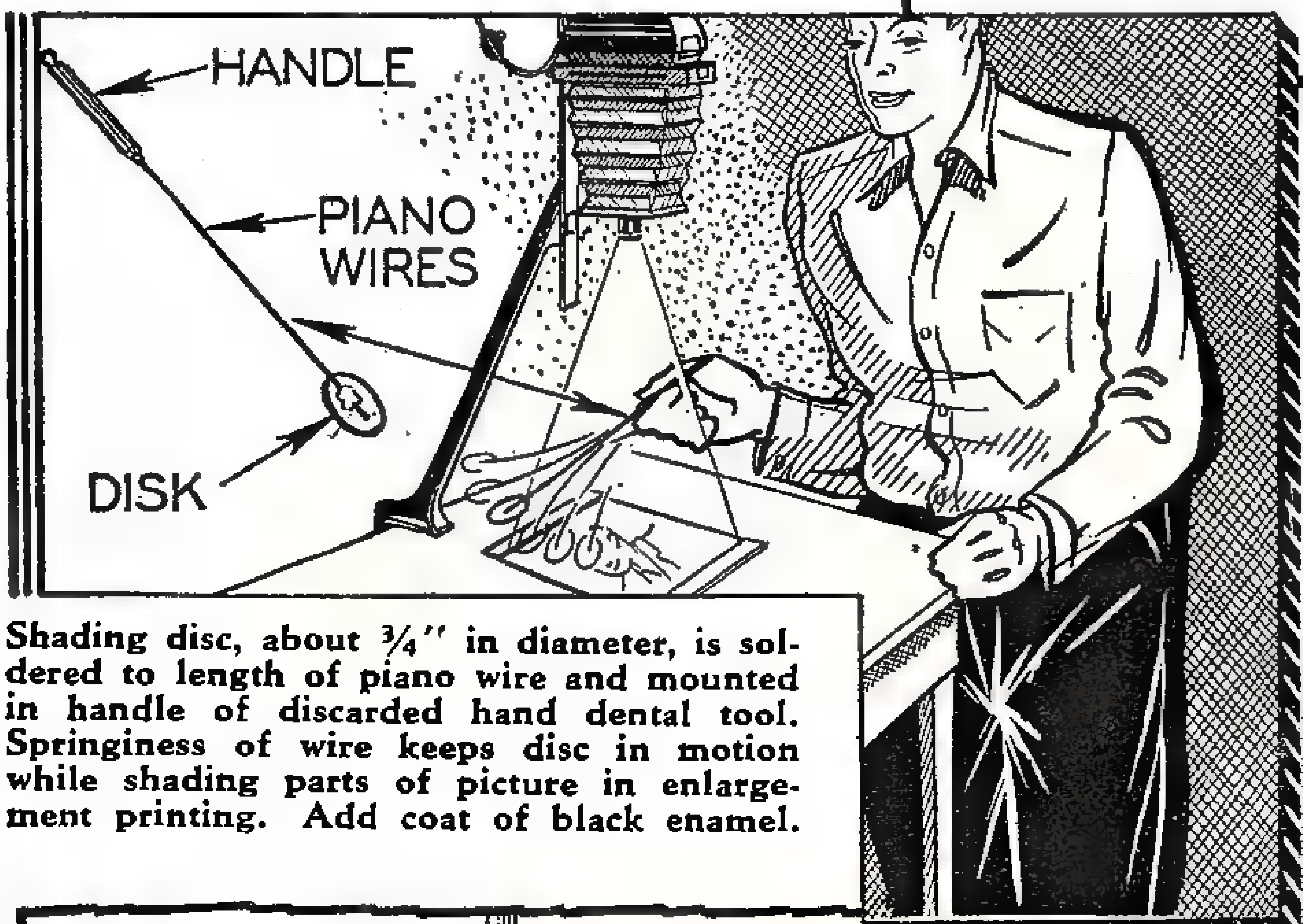
Camera Kinks Aid Amateur Photo-Taking


BLUE CELLOPHANE BETWEEN TWO LAYERS OF CELLULOID
LEATHERETTE PICTURE FRAME

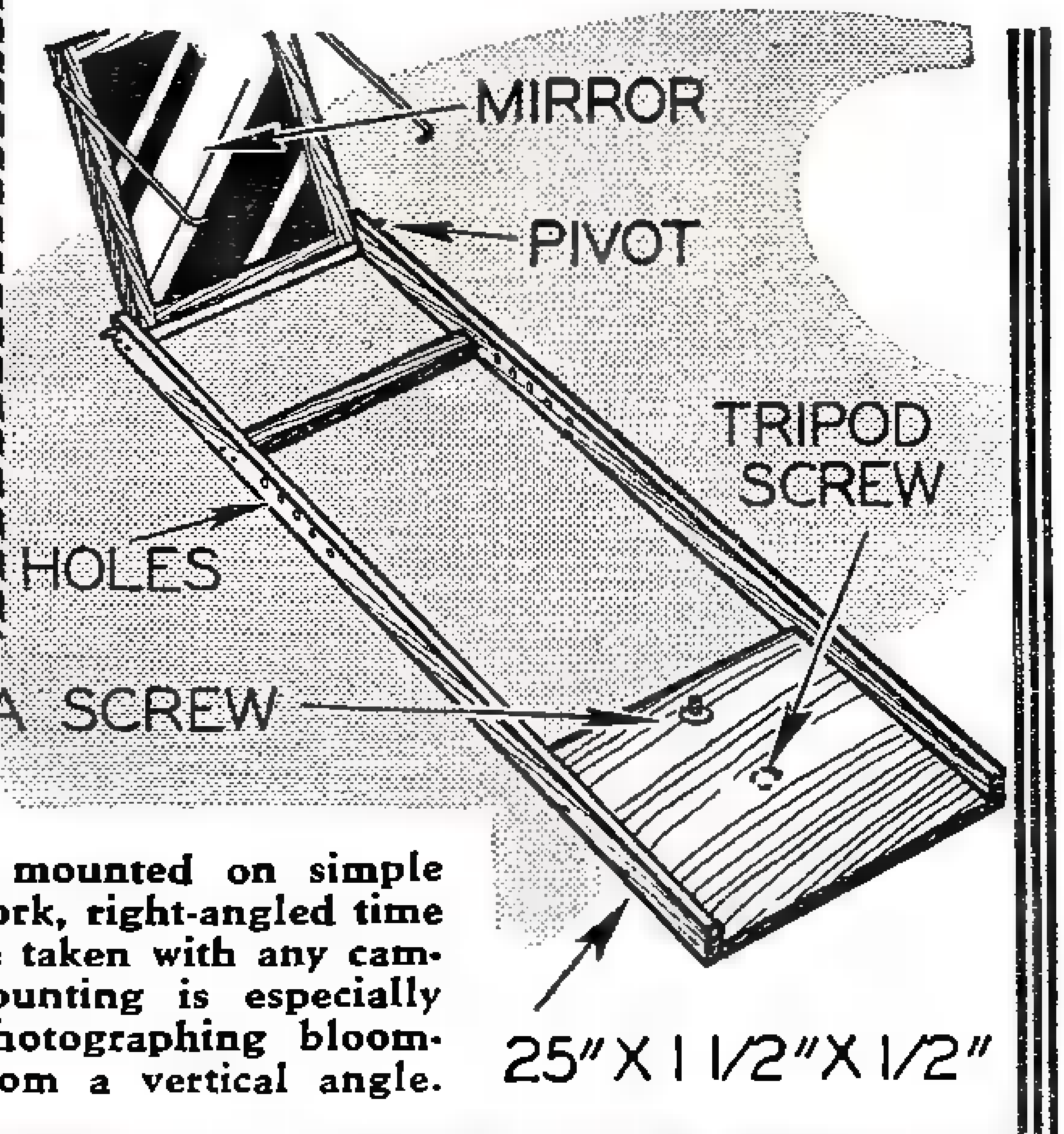
Use scene appraiser made of alternate layers of celluloid and blue cellophane to reduce any scene to monochrome which camera actually records. Make opening about 8"x10". Draw cross-lines in India ink on celluloid. Study the scene with one eye, holding 12" away, then train the camera on the selected scenery.


STRIP OF SPRING BRASS – 4" X 1/2" X .008
1/2" BOLT
THREE LAYERS OF TAPE PREVENTS BOLT FROM TOUCHING SPRING
RELEASE
WIRES TO FLASH LAMP
FIBRE

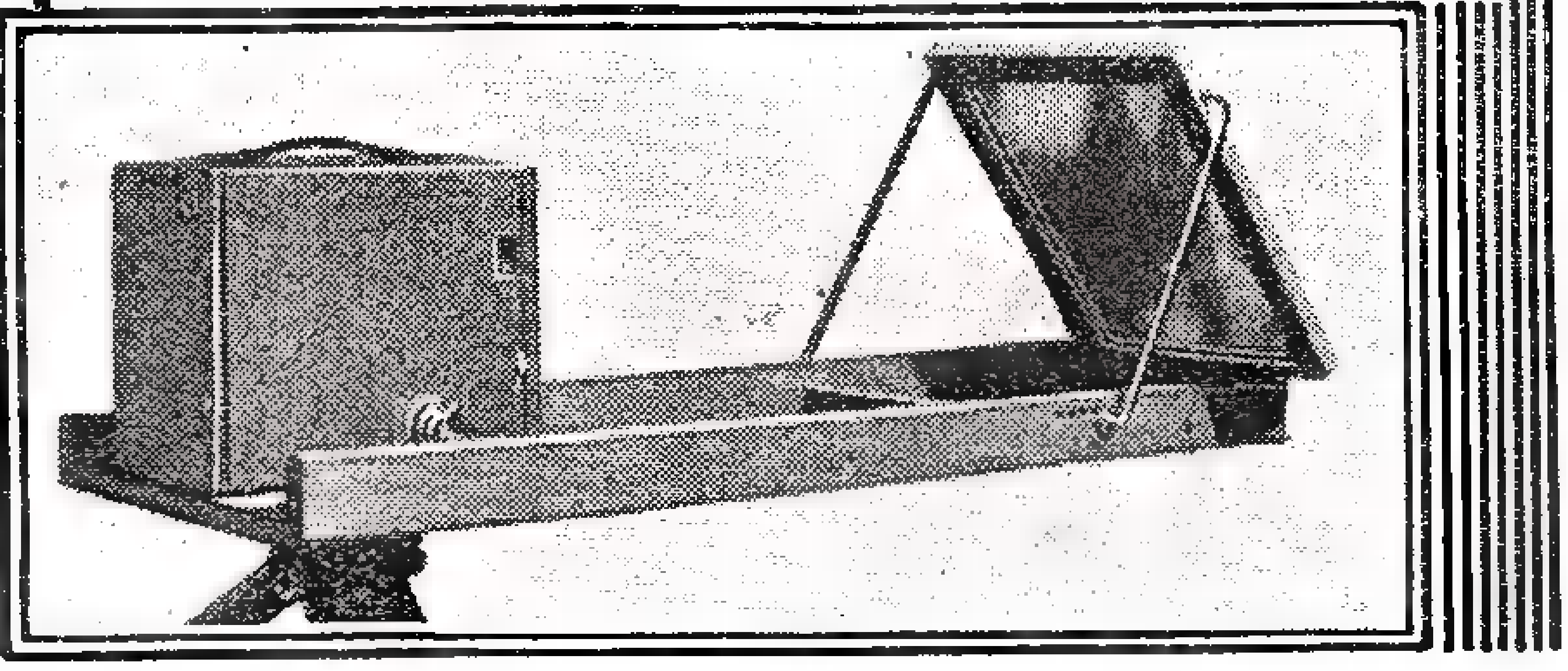
Simple synchronizing switch for taking photoflash shots will work on any camera shutter operated by standard wire release. Construct switch and contacts as shown, and adjust upper ½" bolt so it touches head of lower bolt at same instant camera shutter opens. Connect the switch in series with photo-flash batteries.

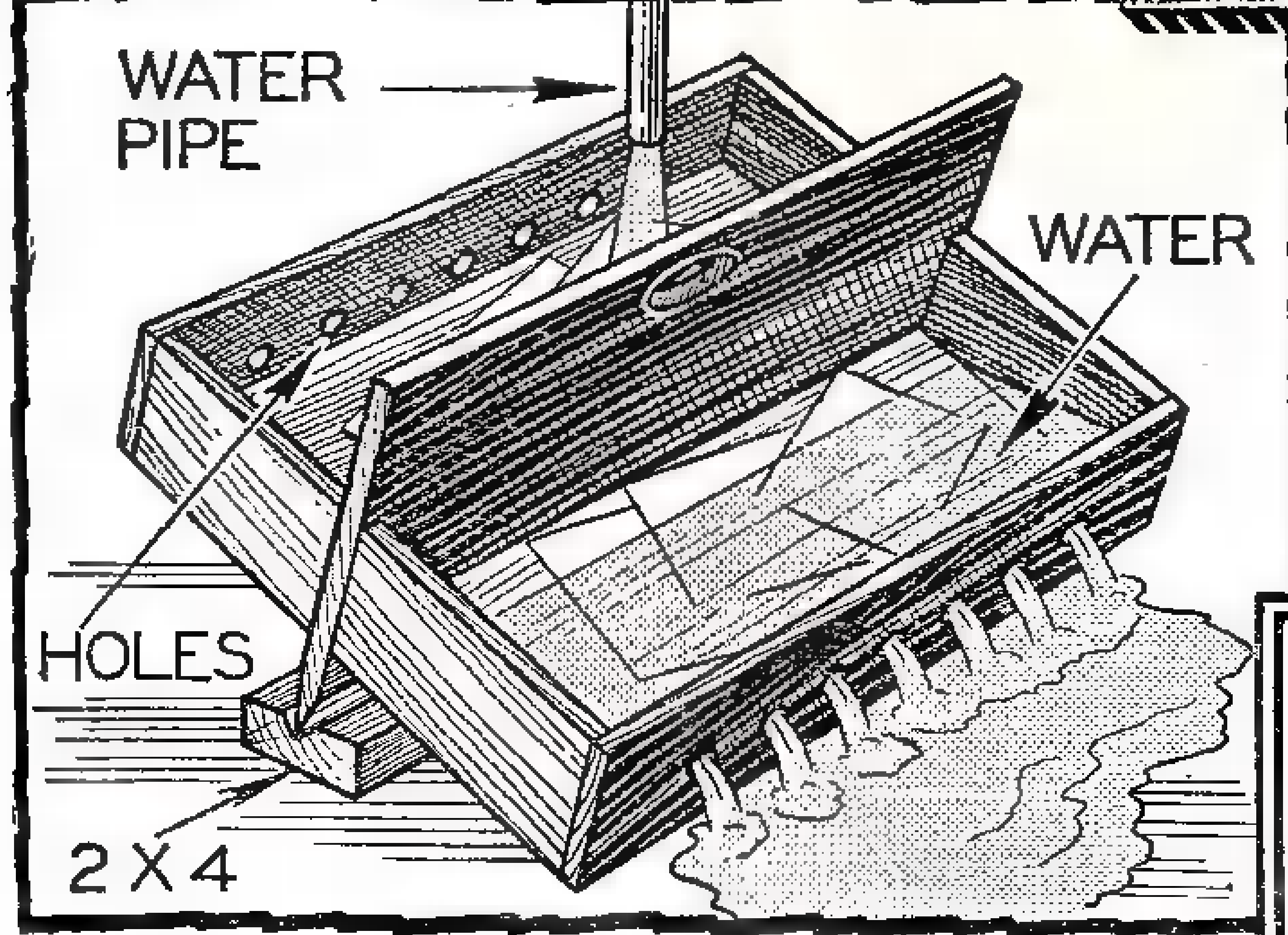

HANDLE
PIANO WIRES
DISK

Shading disc, about ¾" in diameter, is soldered to length of piano wire and mounted in handle of discarded hand dental tool. Springiness of wire keeps disc in motion while shading parts of picture in enlargement printing. Add coat of black enamel.


MIRROR
PIVOT
TRIPOD SCREW
HOLES
CAMERA SCREW
25" X 1 1/2" X 1/2"

With mirror mounted on simple wood framework, right-angled time photos can be taken with any camera. The mounting is especially useful for photographing blooming plants from a vertical angle.



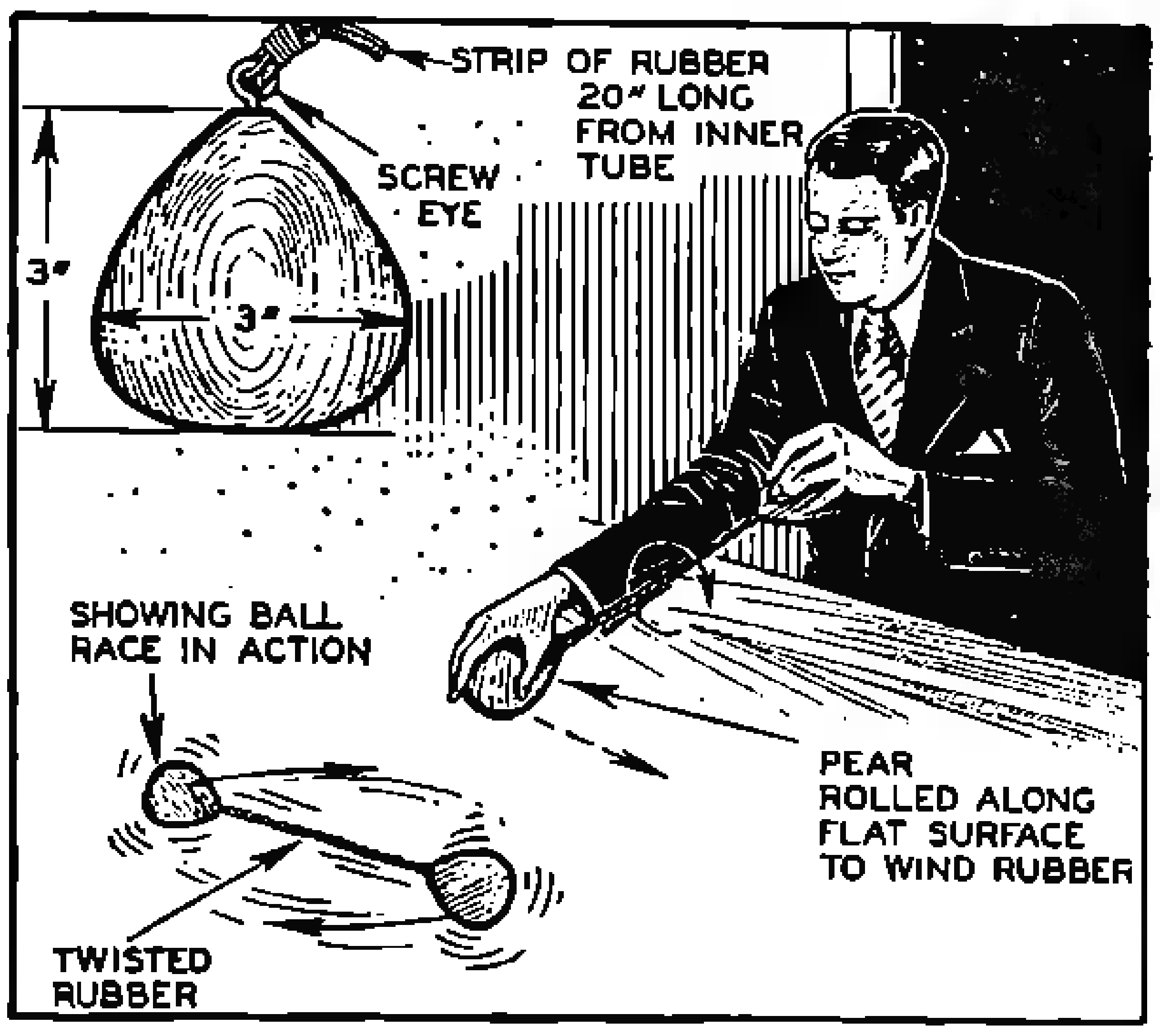

WATER PIPE
WATER
HOLES
2 X 4

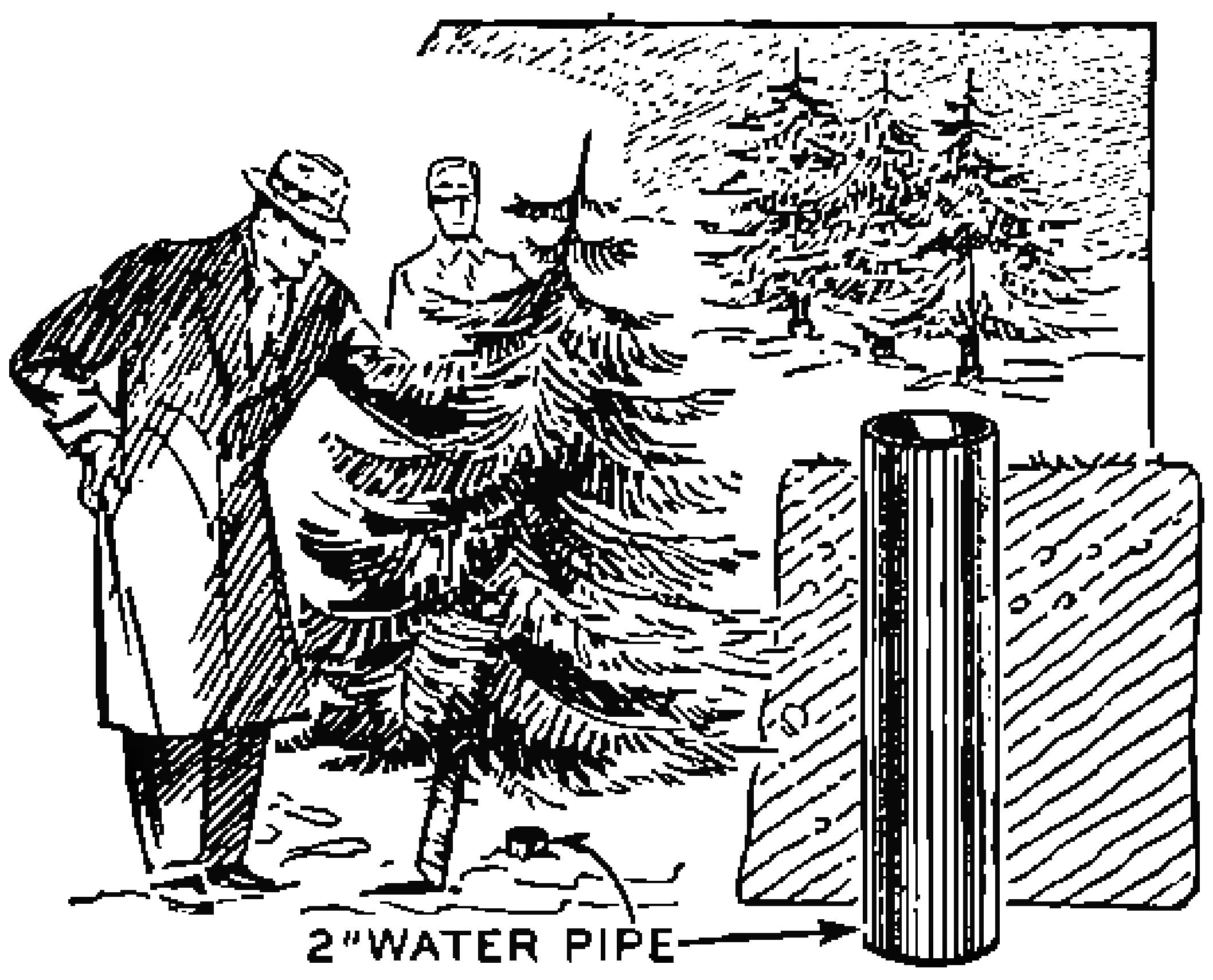
Washer for rinsing negatives or prints is made from pieces of wood. Box tilts back and forth continually as water drains from one side, fills up in other, giving complete change of water every few minutes. Use asphaltum paint for inside of box. Set the washer directly under a water faucet.

MONEY-MAKING SUGGESTIONS

Dancing Wooden Pears Surprise Guests

TURN out two pear-shaped wooden balls on your lathe, connect them with a rubber strip, and watch them perform! Starting slowly at first, the pears chase each other round and round, reversing a few times and perhaps even rolling over each other to finally come to rest. Before cutting off the pears, sand them well and varnish. Place a small screw eye in the small end of each, and connect together with a 20″ long rubber band. To wind up, roll one pear along table while holding the other.—Dale Van Horn.


STRIP OF RUBBER 20″ LONG FROM INNER TUBE
SCREW EYE
3″
3″
SHOWING BALL RACE IN ACTION
PEAR ROLLED ALONG FLAT SURFACE TO WIND RUBBER
TWISTED RUBBER

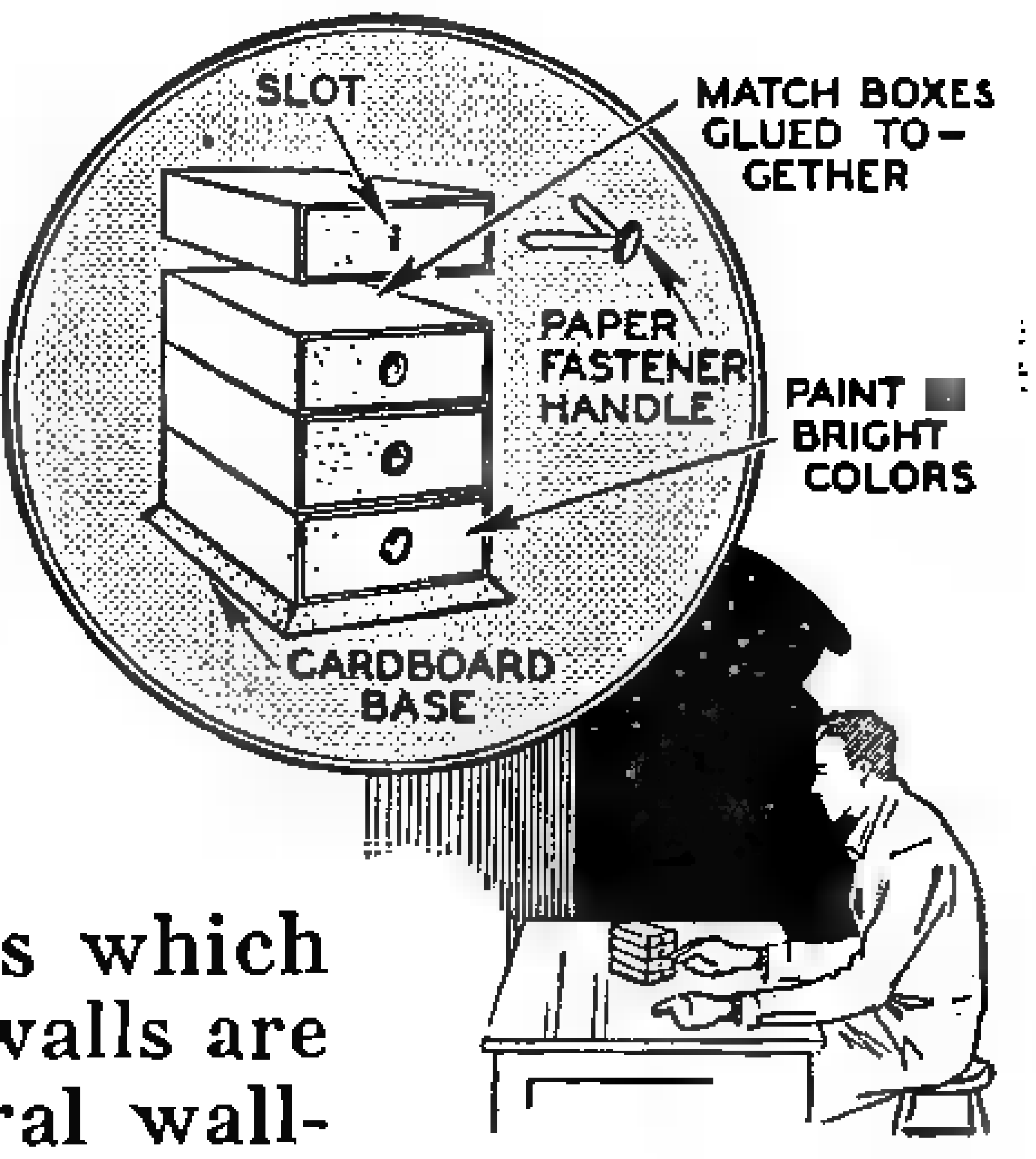

2″WATER PIPE

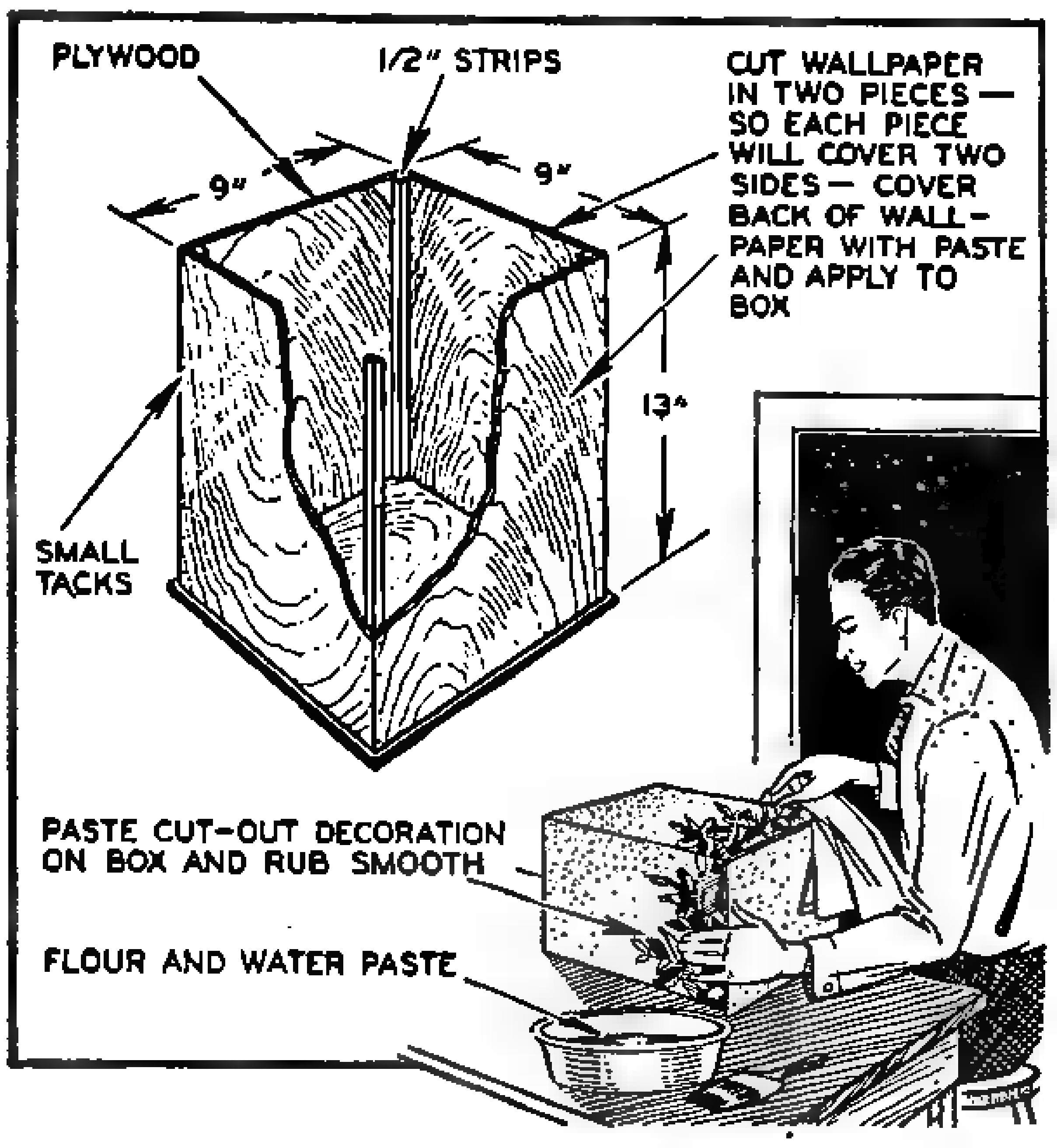
Pipes in Ground Hold Xmas Trees

OWNERS of vacant lots in any city can rent their sites on a percentage basis to Christmas tree venders if they have properly prepared the ground before it freezes. If short lengths of two-inch water pipe are set into ground at perhaps three foot intervals about the lot, they will be found ideal for supporting almost any size of Christmas tree. Allow the pipe to project a few inches above ground, to keep out snow.—Weston Farmer.

Make Match-box Chest for Your Workshop

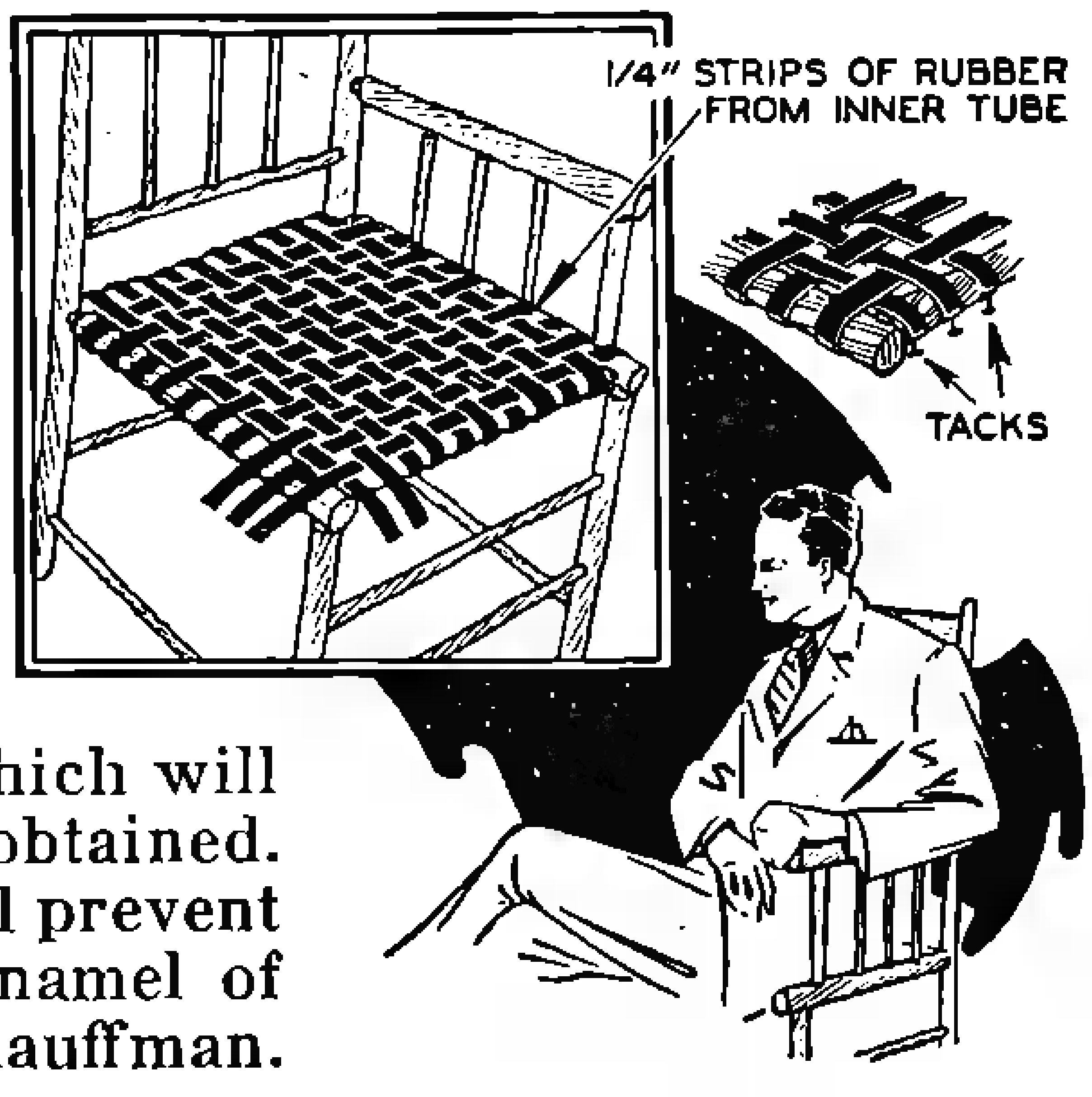
USEFUL for storing small articles which are easily misplaced on the study desk or even for holding small parts on the workbench are these miniature 4-drawer chests. Select four empty small size match boxes and glue the covers together as shown. Mount on a cardboard or wood base and paint.—Elmer Kellerman.


SLOT
MATCH BOXES GLUED TOGETHER
PAPER FASTENER HANDLE
PAINT IN BRIGHT COLORS
CARDBOARD BASE


PLYWOOD
1/2″ STRIPS
CUT WALLPAPER IN TWO PIECES — SO EACH PIECE WILL COVER TWO SIDES — COVER BACK OF WALLPAPER WITH PASTE AND APPLY TO BOX
9″
9″
13″
SMALL TACKS
PASTE CUT-OUT DECORATION ON BOX AND RUB SMOOTH
FLOUR AND WATER PASTE

Wallpaper Decorates Boxes

DAINTY wastepaper boxes which match your guestroom walls are easily made by pasting floral wallpaper cutouts on neatly constructed plywood boxes. After assembling the box, cut out the selected wallpaper pattern, lay it face downward on newspapers, and cover with paste. Allow a few minutes for the paste to soak in, then carefully press down on the wood. Flour and water paste is made by adding boiling water to flour, stirring, and allowing to cool. —C. J. Bronson.

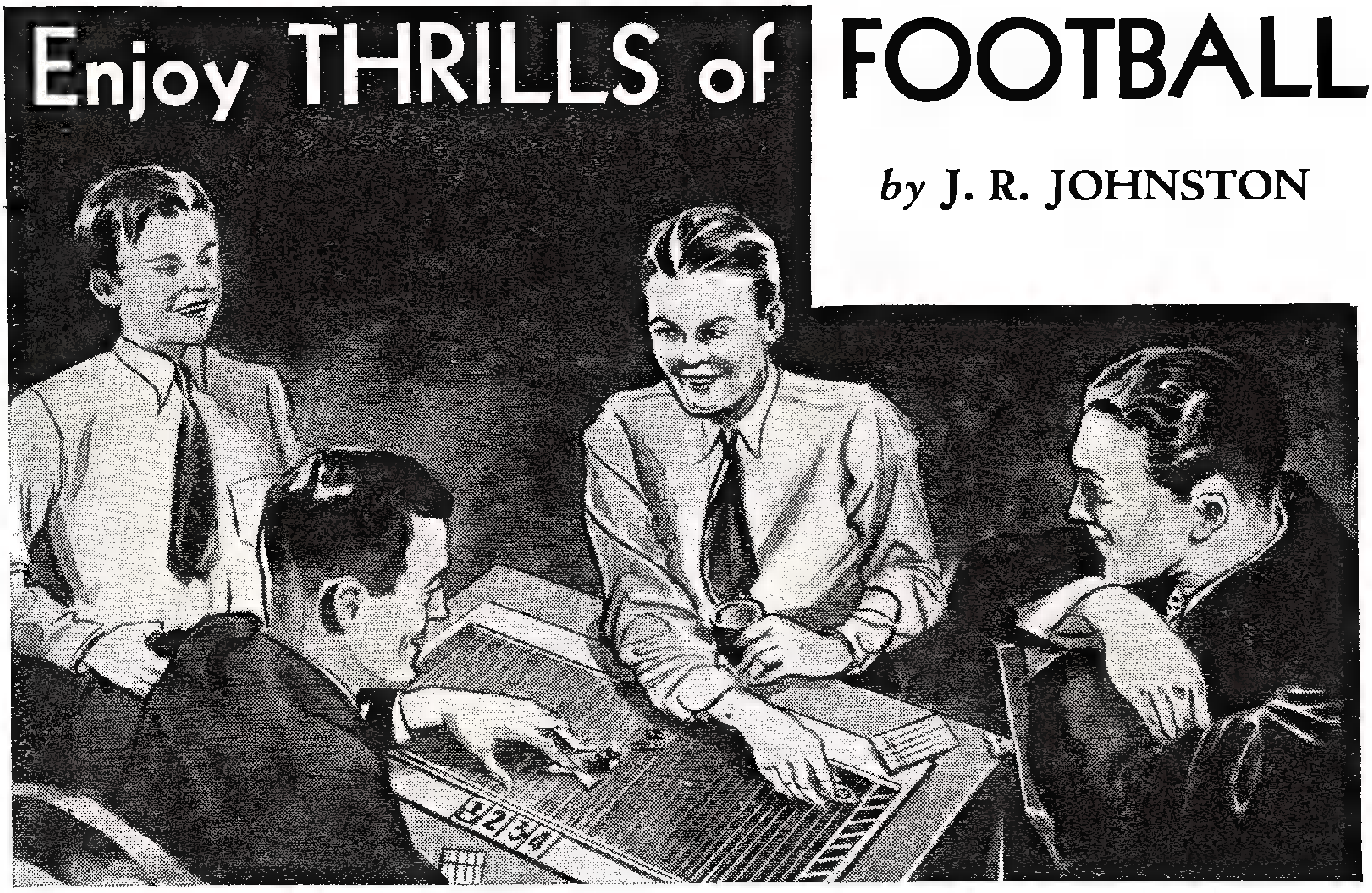

1/4″ STRIPS OF RUBBER FROM INNER TUBE
TACKS

Repair Chairs With Rubber

CANE bottom chairs for the cottage or camp can be neatly repaired by weaving in strips cut from a discarded auto inner tube. Tack ¼″ wide strips of rubber underneath on one side, run over the top of the chair seat, and bring underneath on the other side for tacking. The strips should be stretched before being tacked down permanently. By carefully weaving in the cross pieces, a neat and springy seat which will be even more comfortable than the old cane covering is obtained. Large head tacks, commonly known as carpet tacks, will prevent rubber tearing from support. A coat of lacquer or enamel of any gay color may be applied to the rubber.—J. C. Kauffman.

Enjoy THRILLS of FOOTBALL

by J. R. JOHNSTON



Every play of football is possible with this thrilling new gameboard. Plays are called, dice thrown, results read off from charts, and the football moved as chart indicates.

PLAYS FOR OFFENSE

Punts	Punt Out of Bounds Quick Kick	Lateral Pass	Dice Numbers	Short Pass	Medium Pass	Intercepted Pass and Kick Returns
40	50	N	11	C-8	C-16	8
45D	44	C-30	12	N-9	N-14	0
35	36	N	13	I-11	N-12	3
47	29	C-41	14	C-10	C-21	7
39	35	N	15	N-6	I-18	9
43D	17	N	16	C-7-[illegible]	N-16	F
BL	62	C-33	21	I-9	C-15	70
37	48	I	22	N-3	N-22	9
26	BL-5L	C-12	23	N-7	I-14	11
41D	40	C-47	24	C-10	C-24	7
64	49	I	25	C-4	N-17	0
45D	38	N	26	N-10	C-17-71	1
35	40	C-16	31	C-8	N-19	6
52	BL	F	32	F	I-23	RTD
BL-4G	51	C-21	33	C-9	C-24	9
35	44	N	34	N-5	N-6	31
47	37	I	35	C-7-TD	C-13	0
40	41	N	36	N-7	F	4
36	40	C-8	41	C-11	N-15	7
17	F	5L	42	I-8	I-21	0
44	P-5	C-91	43	C-5-[illegible]1	C-24	3
36	33	N	44	N-10	C-19	55
45	47	I	45	I-9	I-14	0
30	BL-6G	FR-6L	46	N-5	C-21-17	3
40	36	I	51	C-5	N-16	8
BL-TD	43	C-7	52	N-6	I-21	6
35	59	N	53	C-11	N-15	2
41D	35	C-13	54	N-4	P-25	R7YL
FR	46	N	55	C-3	18L	9
30	34	N	56	I-5	C-24	0
51	40	C-R1YL	61	N-8	N-21	0
62	32	N	62	P-5	N-13	F
F	30	I	63	I-7	C-24	27
P-15	BL-TD	C-23	64	C-8	C-20	5
43	46	P-15	65	N-6	I-13	7
48D	BL	C-18	66	C-10	C-22	0

Playing charts can be cut out and pasted on stiff cardboard.

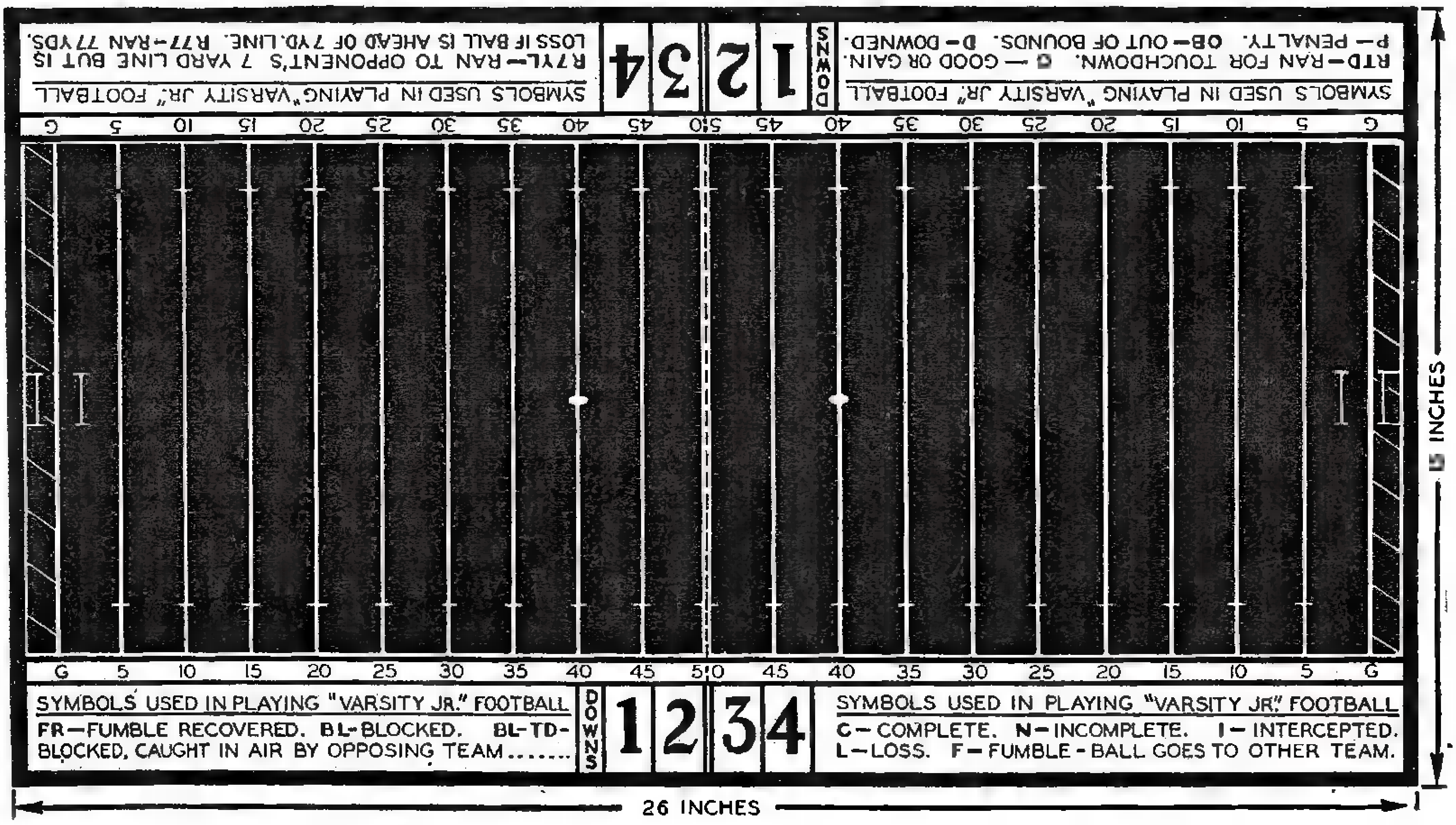
THIS football game has been so simplified that even a ten year old boy can play it. In spite of its simplicity, however, every standard play of a real football game is provided, from straight line plunges and end runs to tricky lateral and forward passes.

In perfecting the game, statistics of every standard play in 100 college games were studied and averaged, to form a basis for determining gains or losses. Because of this, we believe the game conforms more closely to actual football than any other on the market.

So accurate are the play charts that it is possible to kick a 55-yard field goal, close to the record for the longest goal ever made from the field. It is possible to complete a long pass for a gain of 56 yards, also close to the record. Likewise, a pass into the end zone can be completed for a touchdown, or intercepted and run back 50, 77 or 100 yards, the latter resulting in a touchdown. Thrills and "breaks" are just as prominent as in any real game.

The game costs practically nothing to make, and takes little space. It consists of a 26"x15" miniature gridiron, two charts of plays, a football, downs markers, and a pair of dice. The charts are cut out and pasted on cards so that each player or "team" has a set of plays and results to call off. Fifteen columns are provided in the charts, two of which are for dice numbers. The 13 remaining columns contain figures

WITH "VARSITY JR." GAME


SYMBOLS USED IN PLAYING "VARSITY JR." FOOTBALL
R7YL—RAN TO OPPONENT'S 7 YARD LINE BUT IS LOSS IF BALL IS AHEAD OF 7YD. LINE. R77—RAN 77YDS.
DOWNS 1 2 3 4
SYMBOLS USED IN PLAYING "VARSITY JR." FOOTBALL
RTD—RAN FOR TOUCHDOWN. G—GOOD OR GAIN.
P—PENALTY. OB—OUT OF BOUNDS. D—DOWNED.
G 5 10 15 20 25 30 35 40 45 50 45 40 35 30 25 20 15 10 5 G
SYMBOLS USED IN PLAYING "VARSITY JR." FOOTBALL
FR—FUMBLE RECOVERED. BL-BLOCKED. BL-TD-BLOCKED, CAUGHT IN AIR BY OPPOSING TEAM.......
DOWNS 1 2 3 4
SYMBOLS USED IN PLAYING "VARSITY JR." FOOTBALL
C—COMPLETE. N—INCOMPLETE. I—INTERCEPTED.
L—LOSS. F—FUMBLE-BALL GOES TO OTHER TEAM.
26 INCHES
15 INCHES

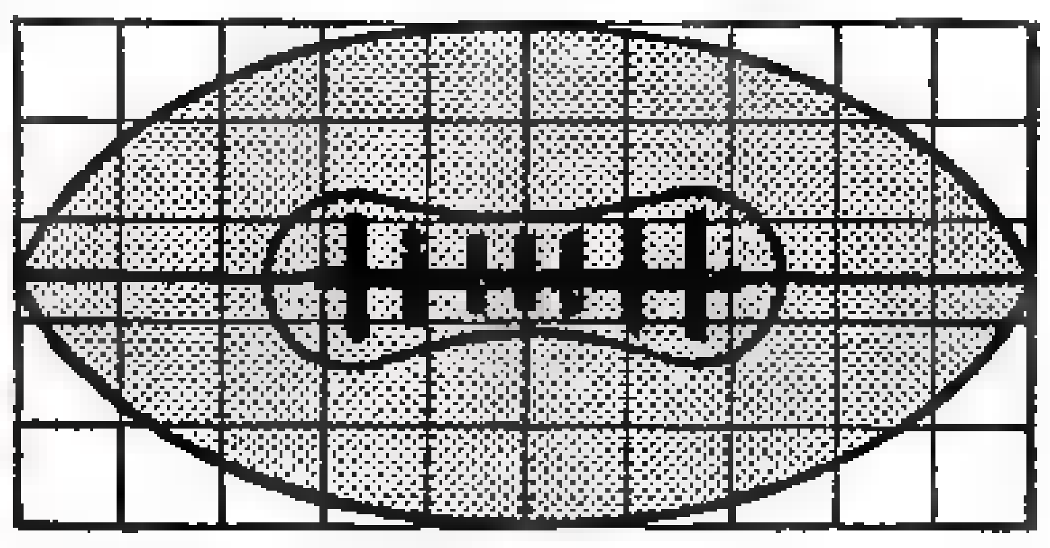
Layout of gridiron for football game. Spaces between white lines may be further divided into individual yard lines. Grid should be laid out on white paper, painted green where black above, with numerals in red or black, and sheet then pasted down evenly on light plywood.

for 16 different plays, with the field goal kicking formation being used for points after touchdowns.

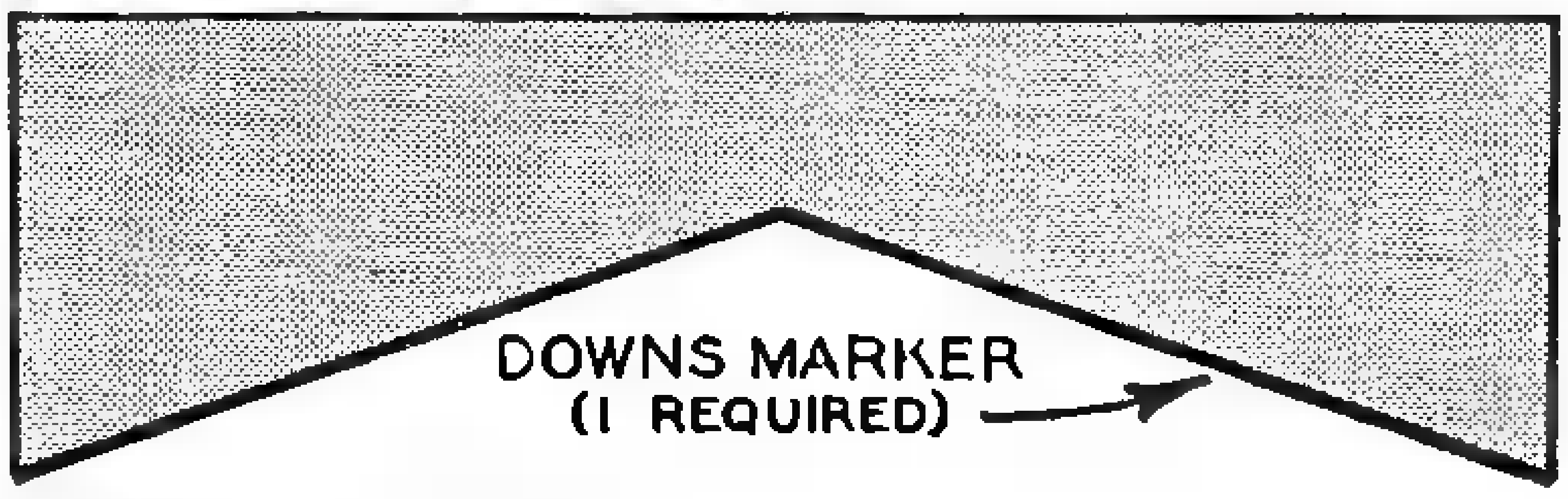
With an alarm clock set to mark 5, 10 or 15 minute periods, whichever desired, the game proceeds like an actual football contest. Choice of goal and kickoff is determined by a throw of the dice, high winning. The dice are of different color, the red in every case showing tenths, the other hundredths. Thus, on the kickoff from the 40

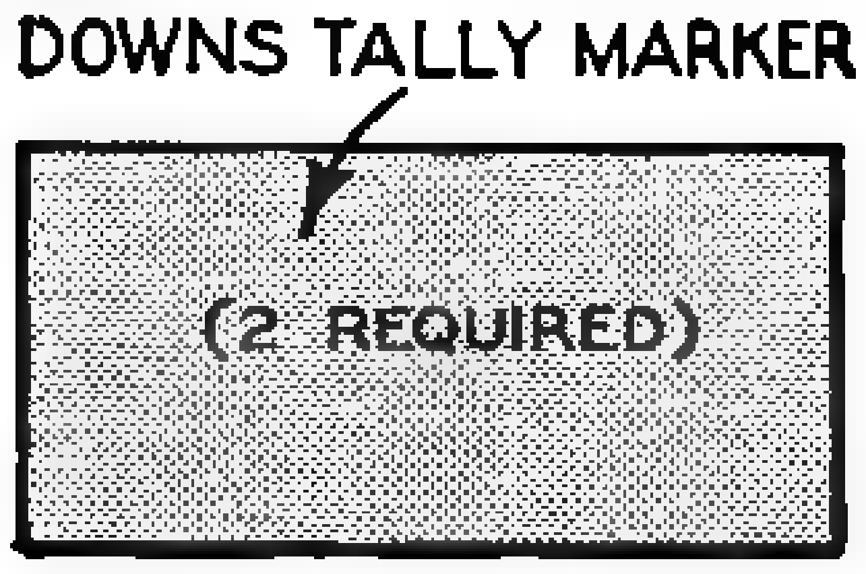
(Continued on page 120)

CUT FOOTBALL FROM ORANGE PASTEBOARD ..DOWNS MARKER AND DOWNS TALLIES FROM BLUE PASTEBOARD OF THREE-PLY WEIGHT..



MAKE 1 FOOTBALL THUS


DOWNS MARKER
(1 REQUIRED)


DOWNS TALLY MARKER
(2 REQUIRED)

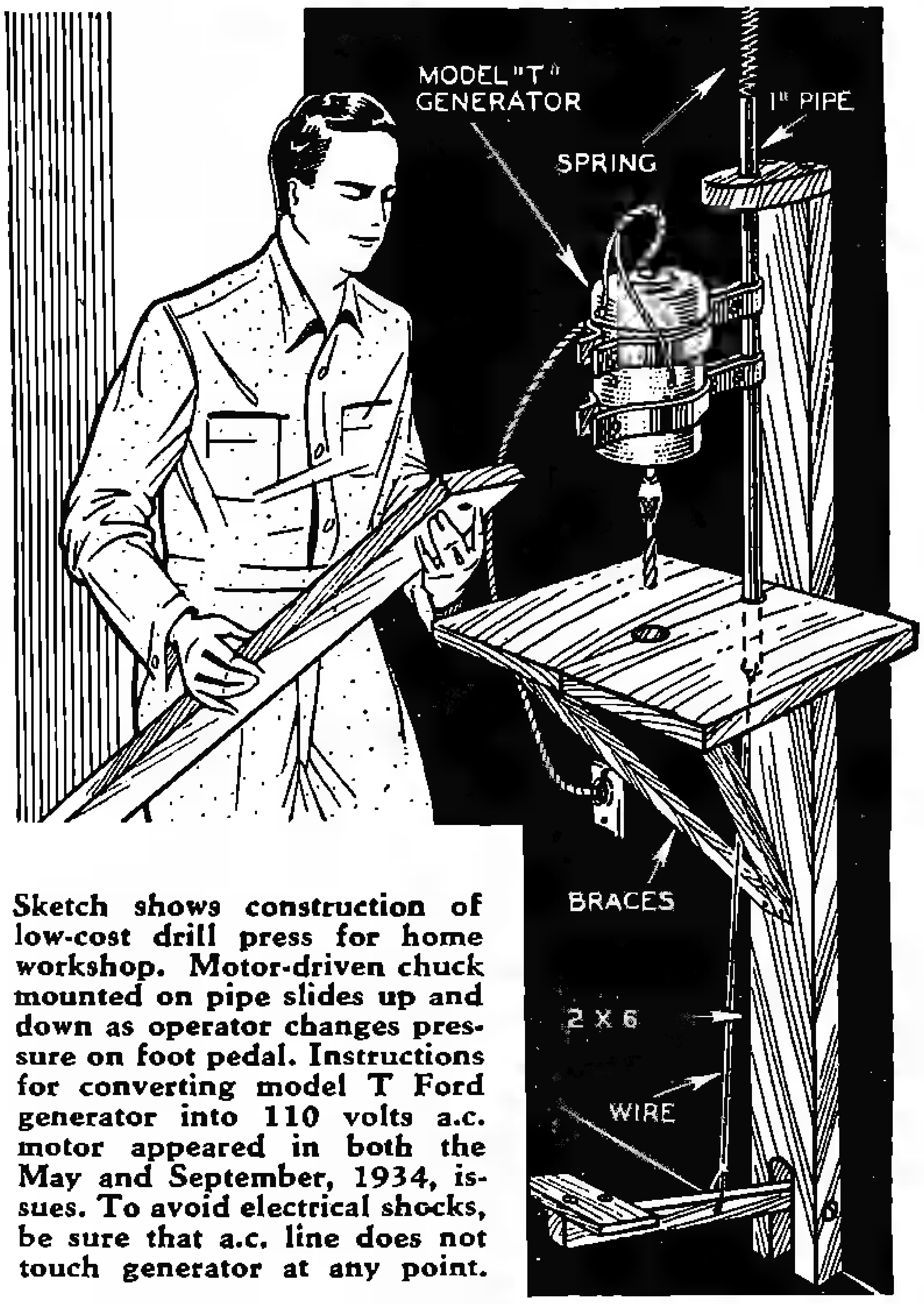
Full size patterns for ball and markers are shown above. Downs marker will cover 10 yards on full size game board. Downs tallies are moved to proper numerals at each side of board to indicate correct number of down.

PLAYS FOR OFFENSE

Long Pass	End Zone Pass	Kickoff & Free Kick	Dice Numbers	Line Buck	End Run	Fair Catch	Field Goal Kick for Point
I-35	C	50	11	1	6	G	G-15
C-32	N	45	12	0	3	G	G-45
N-39	C	40	13	3	0	G	WIDE
I-30	N	48	14	2	0	F	G-5
C-31	N	55	15	0	4	G	G-20
N-41	C	40	16	7	1	G	G-15
C-30	N	35	21	4	8L	G	G-9
N-36	C	56	22	F-R	5	F	LOW
F	N	35	23	0	3	G	G-50
C-25	N	45	24	1	0	G	BL
N-27	N	39	25	0	1	F-R	G-5
N-30	IRTD	45	26	3	4	G	WIDE
C-25	N	24	31	2	0	G	G-25
I-26	7L	65	32	0	33	G	G-20
N-25	C	47	33	22	9	F	WIDE
N-50	N	54	34	0	0	G	LOW
C-48	N	40	35	1	16	G	G-40
N-40	C	58	36	4L	0	G	WIDE
8L	N	50	41	3	1	G	G-12
C-40	C	52	42	5	6	F	G-35
N-42	F	43	43	0	P-5	G	WIDE
I-40	5L	45	44	F	7	F-R31	G-40
FR6L	C	57	45	0	1	G	LOW
C-40	N	41	46	3	3	G	G-30
I-25	N	30	51	8	5L	G	G-48
C-37	N	55	52	0	F	G	F
N-29	I-R50	45	53	1	1	F	G-33
P-15	N	40	54	1L	RTD	G	WIDE
I-40	C	OB	55	3	0	G	G-40
N-32	N	62	56	RTD	3	F	G-25
C-37	N	38	61	0	8	G	BL
N-41	C	50	62	6	41	G	G-40
C-56	C	40	63	4	0	G	G-55
I-25	C	48	64	7	3L	G	BL6L
N-33	18L	39	65	1	10	G	WIDE
C-29	I-R77	40	66	0	7	F	G-40

Call offensive plays from these charts, then throw dice.

Sliding-Pipe Drill Press Is Powered by a Ford Generator



Sketch shows construction of low-cost drill press for home workshop. Motor-driven chuck mounted on pipe slides up and down as operator changes pressure on foot pedal. Instructions for converting model T Ford generator into 110 volts a.c. motor appeared in both the May and September, 1934, issues. To avoid electrical shocks, be sure that a.c. line does not touch generator at any point.

A FORD generator converted for 110-volt a.c. use serves as power unit for this inexpensive but serviceable drill press. The drill is fed by foot lever, leaving the hands free to hold the work.

The drill chuck is mounted directly on the generator, after turning down the shaft slightly in a lathe. The generator is then mounted rigidly on a length of 1-inch pipe, either by welding or by using strap iron clamps and bolts.

Drill table and the top pipe support are screwed to a 2"x6" upright which is fastened to a wall or to the end of the workbench. A spring fastened to the top of the pipe and running up to a ceiling joist is adjusted to hold the drill a few inches above the table. With the foot pedal hooked to the lower end of the pipe the drill is easily controlled.

By placing router bits in the chuck, carvings of panels for furniture can be done.

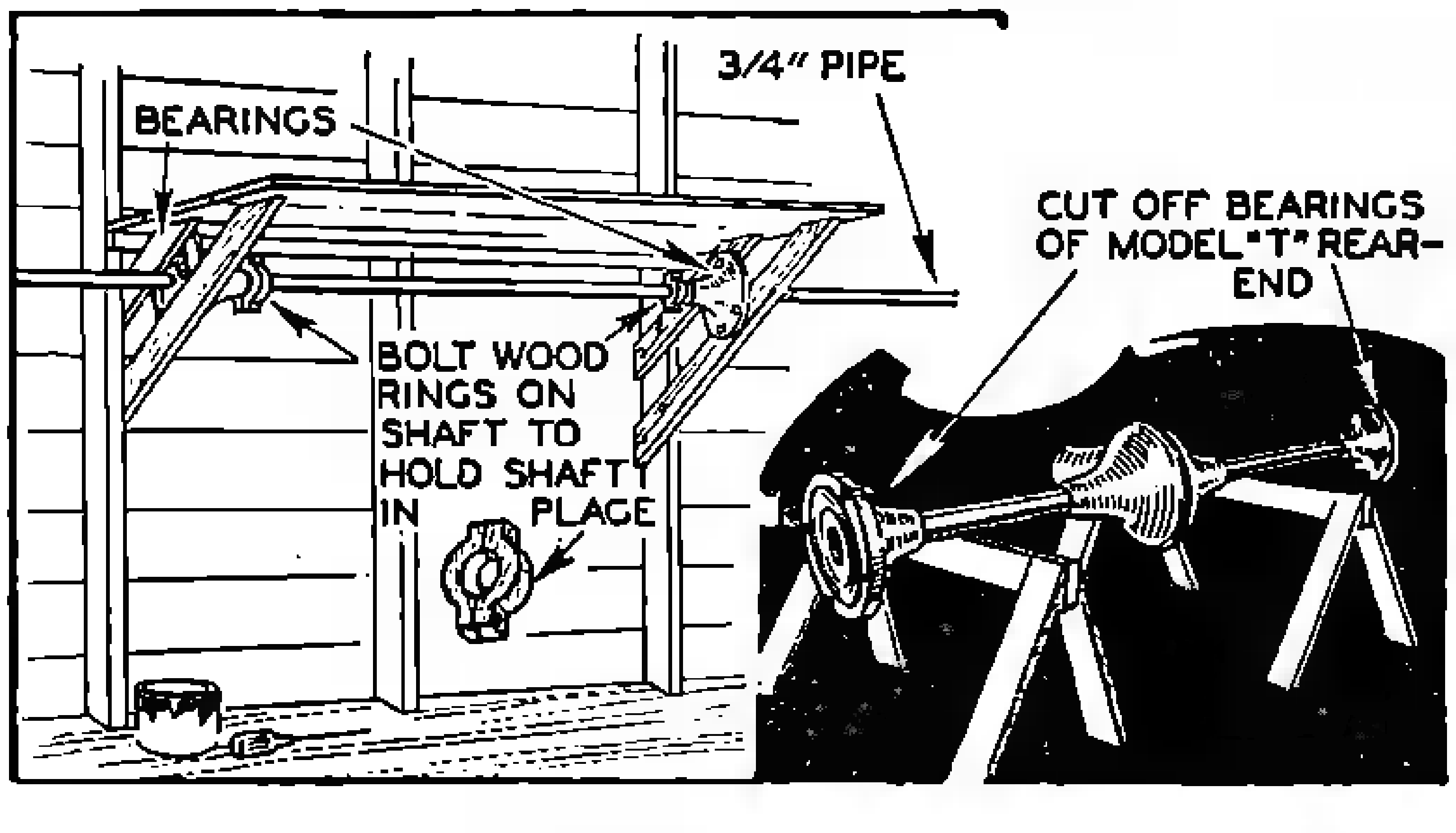
Line Shaft Uses Ford Bearings

THOUGH a line shaft is almost a necessity in a workshop, many hesitate to install one because of the expense. Experience has shown that ¾" galvanized pipe is strong enough for shafting in most shops. It so happens that this diameter of pipe will fit nicely into the roller bearings of a Ford rear end.

Cut the bearings off from the housing with a hacksaw. The brake shoe mounting holes will be found convenient for bolting the bearing housing to either bench or shelf supports.

Blocks of wood are bolted tightly to the shaft between bearings to stop end play.

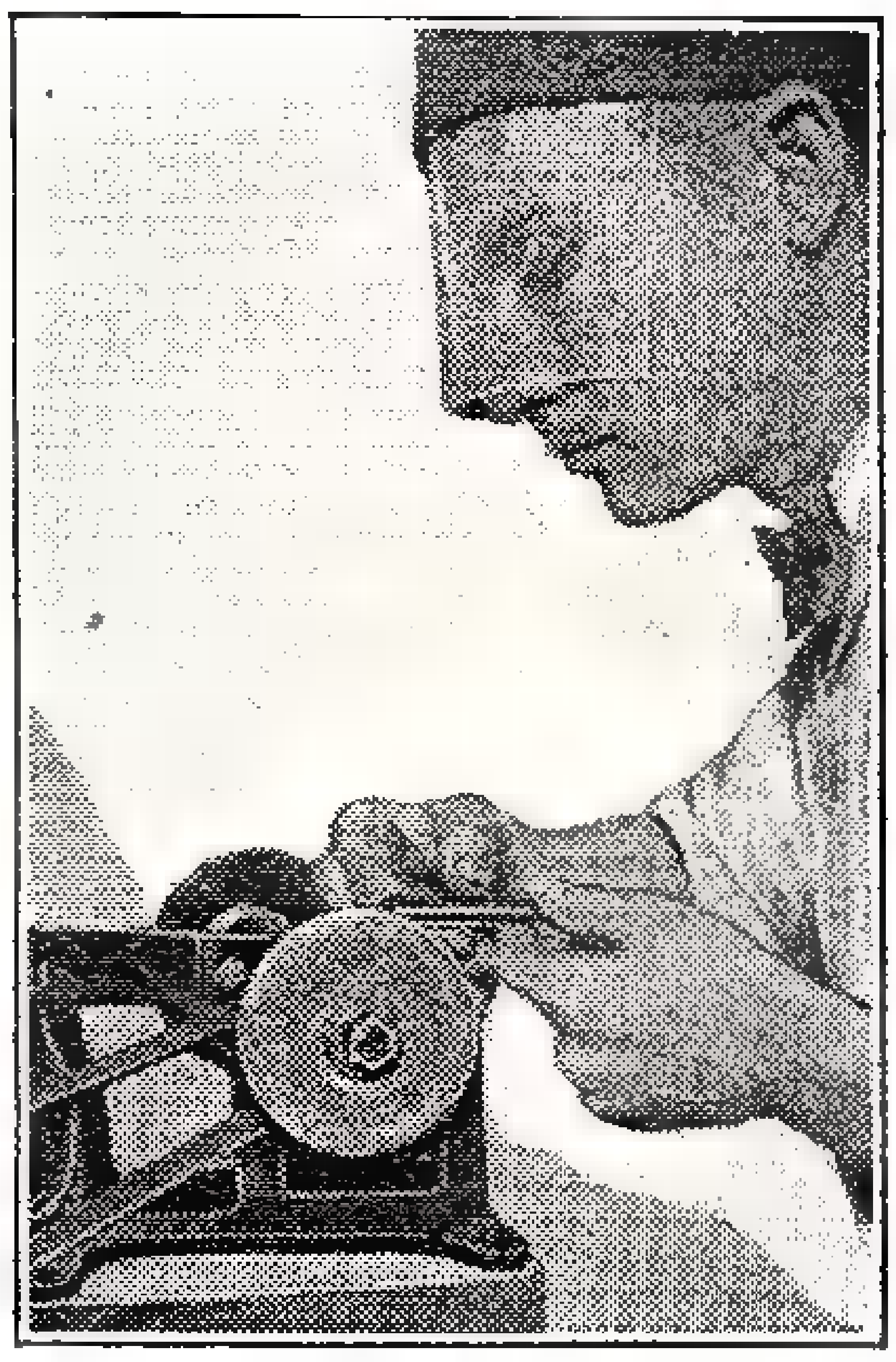
The pipe should be polished with either sandpaper or a fine whetstone at points where it touches the roller bearings.


BEARINGS
3/4" PIPE
CUT OFF BEARINGS OF MODEL "T" REAR-END
BOLT WOOD RINGS ON SHAFT TO HOLD SHAFT IN PLACE

Mounting for line shaft using old auto bearings. Wood rings take up end play. For longer shaft use 3 bearings.

Celluloid Sheet Is Grinding Mask

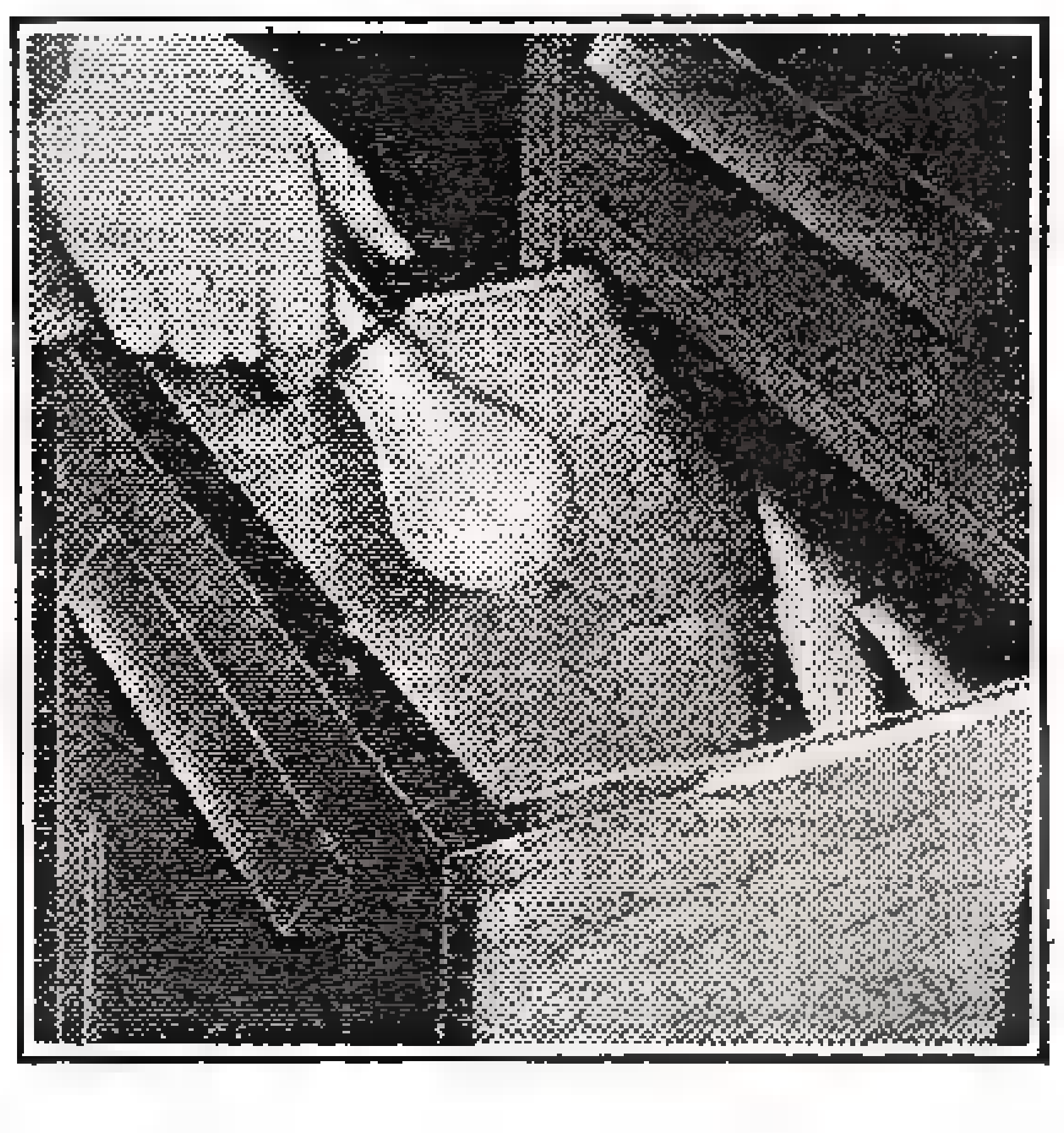
A SERVICEABLE substitute for goggles when working on an emery wheel can easily be improvised from a sheet of celluloid or cellophane. The sheet of transparent material is held in place by slipping underneath a cap which is put on backwards. Clear vision is afforded on all sides, with no discomfort to the wearer, and eyes are protected from flying grit.



Celluloid or cellophane mask slipped under cap keeps dust and grit out of operator's eyes, yet gives no discomfort.

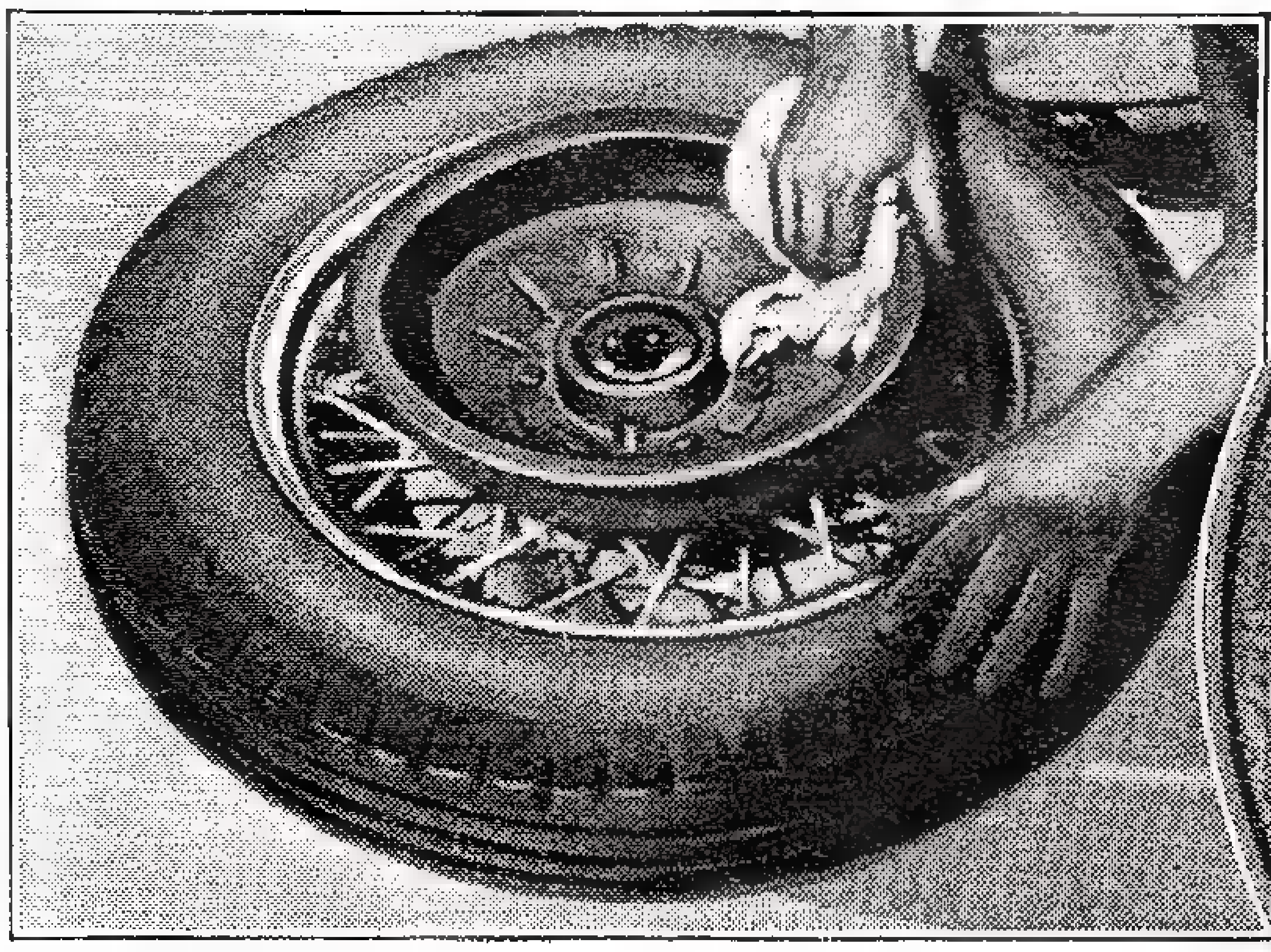
Stop Sticking of Desk Drawers

THE annoying sticking of desk and dresser drawers in damp weather can be abolished by placing a small electric light bulb in each drawer, and turning the current on for several hours. Larger bulbs should not be used, since they will warp the wood badly.

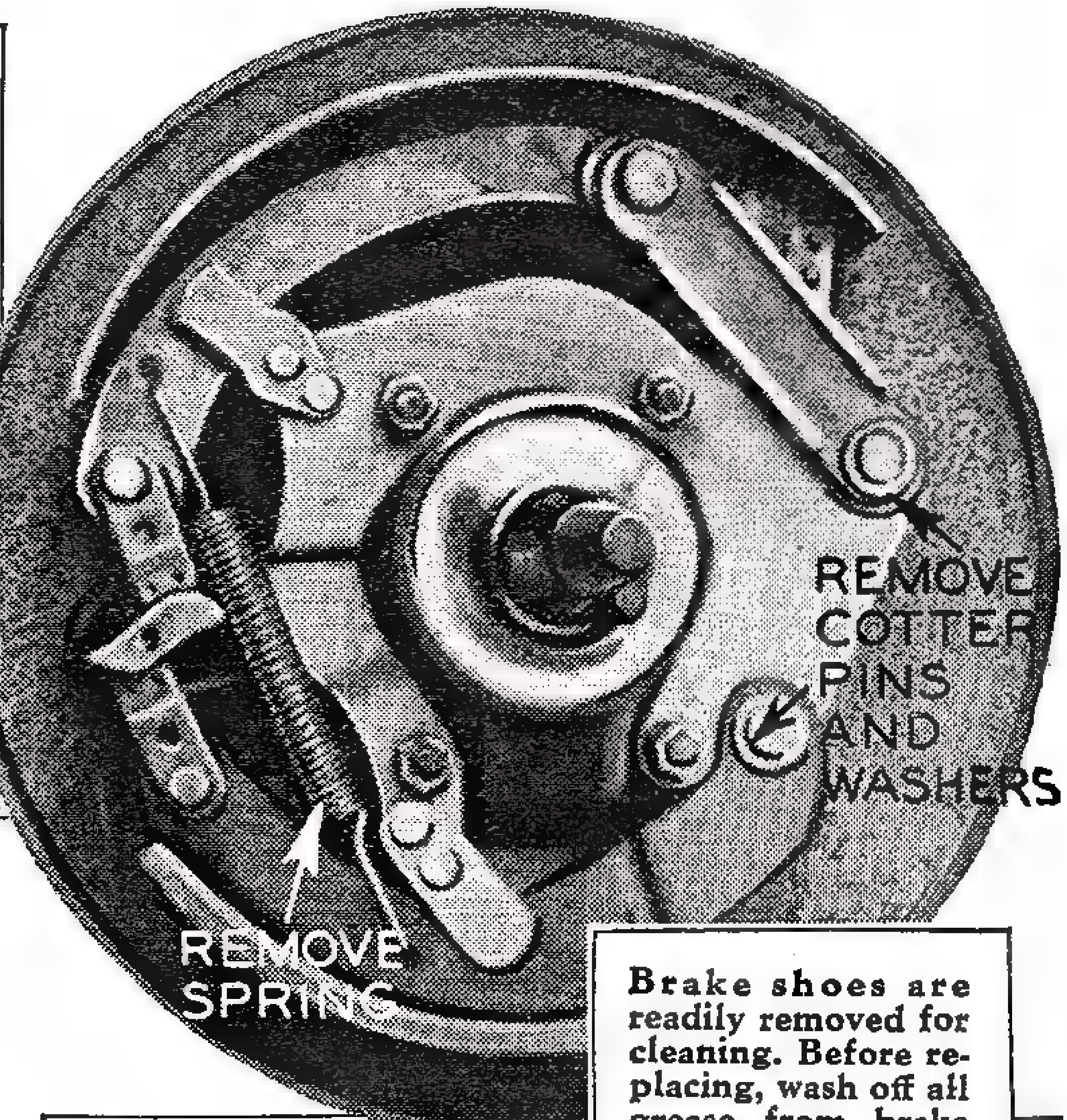


Place 25-watt electric bulb in damp drawer for several hours to relieve annoying sticking.

CURES *for* NOISY AUTO BRAKES



Clean inside of brake drum with gasoline to remove grease. On most cars wheel and drum will come off together without using puller if hub cap and axle nut are first removed.



Brake shoes are readily removed for cleaning. Before replacing, wash off all grease from brake housing with gasoline or kerosene.

MOST automobilists detest squealing brakes, yet few realize that they can be made noiseless without cost or much manual effort on the part of the ordinary car owner.

Usually noisy brakes are caused by grease and dust accumulating on the brake linings. In the springtime, the winter bearing grease, if not replaced in time by the proper summer lubricant, will leak down into the brake drum and cause the above mentioned trouble.

Treatment Applies to Any Car

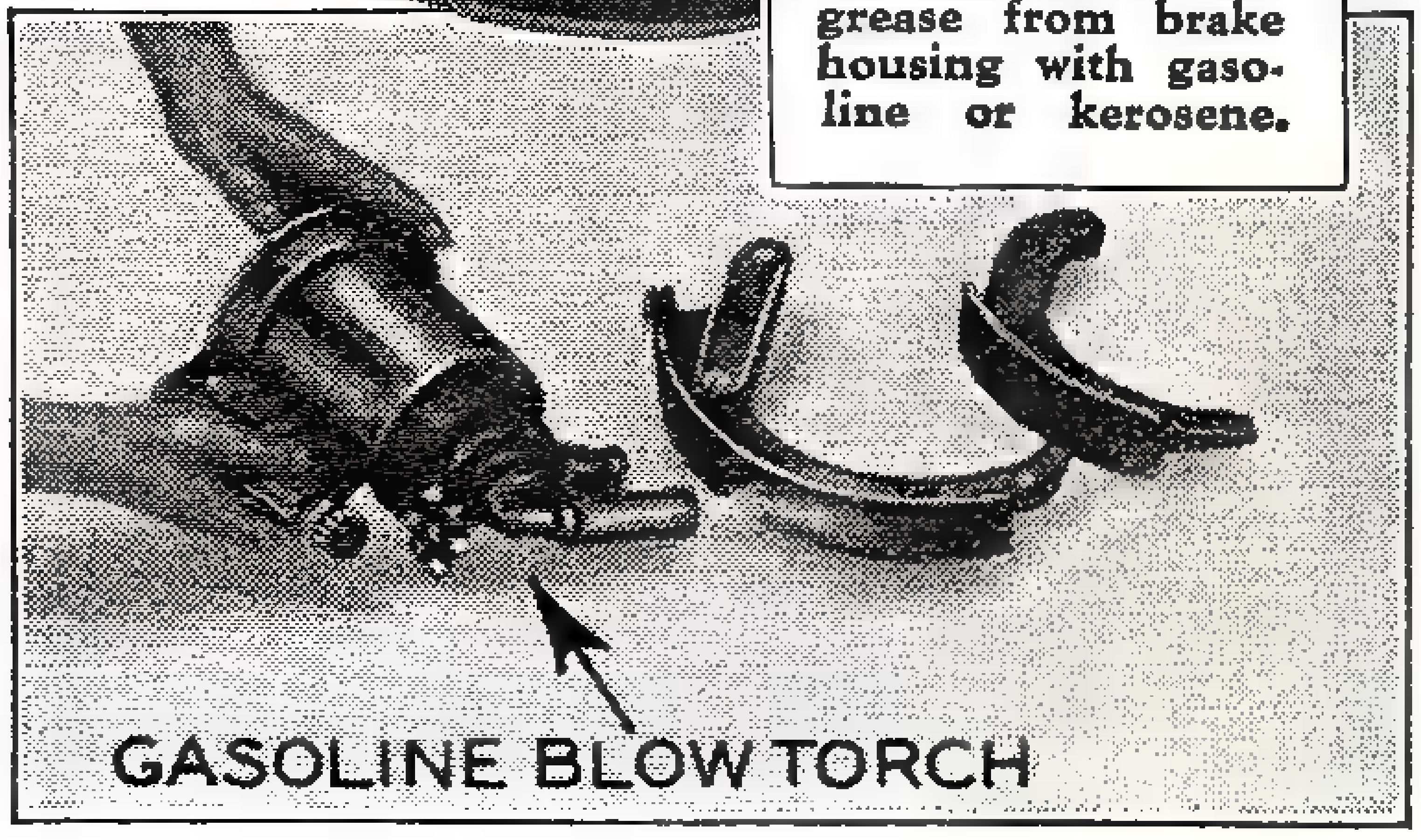
If noisy brakes are due to this, the following simple operation—used and recommended by expert automobile mechanics—will restore the brakes to their former silent state. The treatment will require about 20 minutes a wheel and will be essentially the same for both front and rear. Proceed as follows:

The entire wheel and outer brake drum must be taken off. This is done by removing the cotter pin and lock nut holding the wheel to the axle. The wheel will then slide off, tire, rim, and all, if pulled firmly and twisted back and forth at the same time. In a few cases, where the brake drum has not been removed for some time, it will be necessary to use a wheel-puller.

Brake Shoes Are Easily Removed

To insure easier handling, the brake shoes should now be removed. Remove the spring holding the shoes together by gripping at the upper end with pliers and stretching upwards and outwards. Remove the lock washers at the opposite ends of the brake shoes and the shoes will come off.

Now one of two methods can be followed: The brake shoes can be washed in gasoline until the grease and dust have been removed from the lining; or, if the grease is imbedded too thoroughly to be washed away, it can be burned from the lining with a blow torch or ordinary flame. Care should be taken not to burn the lining excessively.



Where brake lining is so badly glazed that gasoline will not remove grease layer, carefully heat with blowtorch until glaze is softened. File off all rough edges on lining.

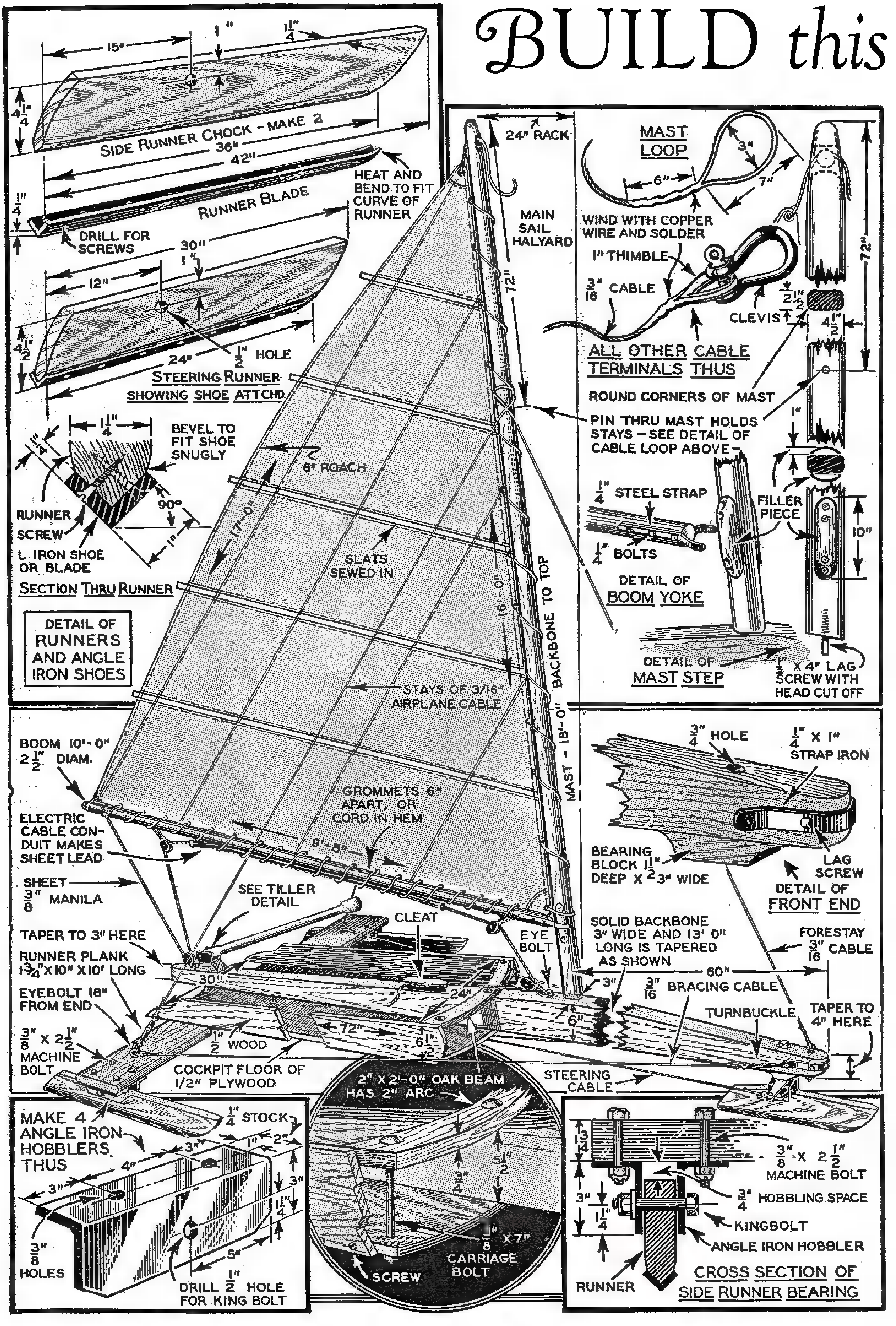
Regardless of which method is employed, the inside of the brake drum should be washed clean with gasoline.

In case the squealing is not caused by grease or dirt but by something apparently undeterminable, the following procedure often proves effective. The upper outer edge of the brake lining should be filed down slightly. Only the edges should be worn away. Any ordinary file will be suitable.

Proper Grease Stops Further Squeals

Of course, if the brake lining is glazed and completely worn out, it will have to be replaced. Otherwise the above mentioned operations will, in most cases, entirely eliminate the objectionable squealing. After the trouble has been remedied, care should be taken to use the proper lubricants in bearings and grease cups to prevent the grease from again leaking into the drums.

BUILD this



SIDE RUNNER CHOCK - MAKE 2
15"
1"
1 1/4"
4 1/4"
36"
42"
1/4"
RUNNER BLADE
DRILL FOR SCREWS
HEAT AND BEND TO FIT CURVE OF RUNNER
30"
12"
1"
4 1/2"
24"
1/2" HOLE
STEERING RUNNER SHOWING SHOE ATTCHD.
1 1/4"
1/4"
BEVEL TO FIT SHOE SNUGLY
RUNNER
SCREW
90°
1"
L IRON SHOE OR BLADE
SECTION THRU RUNNER
DETAIL OF RUNNERS AND ANGLE IRON SHOES
24" RACK
MAIN SAIL HALYARD
72"
6" ROACH
17'-0"
SLATS SEWED IN
16'-0"
BACKBONE TO TOP
STAYS OF 3/16" AIRPLANE CABLE
MAST - 18'-0"
MAST LOOP
3"
6"
7"
WIND WITH COPPER WIRE AND SOLDER
1" THIMBLE
3/16" CABLE
CLEVIS
2 1/2"
4 1/2"
72"
ALL OTHER CABLE TERMINALS THUS
ROUND CORNERS OF MAST
PIN THRU MAST HOLDS STAYS - SEE DETAIL OF CABLE LOOP ABOVE
1"
1/4" STEEL STRAP
1/4" BOLTS
FILLER PIECE
10"
DETAIL OF BOOM YOKE
DETAIL OF MAST STEP
1/2" X 4" LAG SCREW WITH HEAD CUT OFF
BOOM 10'-0" 2 1/2" DIAM.
ELECTRIC CABLE CONDUIT MAKES SHEET LEAD
SHEET 3/8" MANILA
GROMMETS 6" APART, OR CORD IN HEM
9'-8"
SEE TILLER DETAIL
CLEAT
EYE BOLT
TAPER TO 3" HERE
RUNNER PLANK 1 3/4" X 10" X 10' LONG
30"
24"
EYEBOLT 18" FROM END
3/8" X 2 1/2" MACHINE BOLT
1/2" WOOD
72"
6 1/2"
COCKPIT FLOOR OF 1/2" PLYWOOD
3/4" HOLE
1/4" X 1" STRAP IRON
BEARING BLOCK 1 1/2" DEEP X 3" WIDE
LAG SCREW
DETAIL OF FRONT END
SOLID BACKBONE 3" WIDE AND 13' 0" LONG IS TAPERED AS SHOWN
FORESTAY 3/16" CABLE
60"
3"
3/16" BRACING CABLE
6"
TURNBUCKLE
TAPER TO 4" HERE
STEERING CABLE
MAKE 4 ANGLE IRON HOBBLERS THUS
1/4" STOCK
3"
1"
2"
4"
3"
3"
1 1/4"
3/8" HOLES
5"
DRILL 1/2" HOLE FOR KING BOLT
2" X 2'-0" OAK BEAM HAS 2" ARC
5 1/2"
3/4"
3/8" X 7" CARRIAGE BOLT
SCREW
1 3/4"
3"
1 1/4"
3/8" X 2 1/2" MACHINE BOLT
3/4" HOBBLING SPACE
KINGBOLT
ANGLE IRON HOBBLER
RUNNER
CROSS SECTION OF SIDE RUNNER BEARING

Assembly of front-steering iceboat is shown in center drawing, with construction details at sides. Professional sailmaker will make sails directly from above sail plan. After making backbone, first step is to put plywood cockpit floor in place, locating 10 inches from rear end. Light wooden slats are sewed into sail at approximately 2½-foot intervals.

Front-Steering ICEBOAT

by JULIUS J. FANTA

Here is the front-steering iceboat in action, skimming over ice before an 18-mile wind at 50 miles per hour. Slight changes were made in plans after this boat was tested.

THERE are three distinct advantages in building and sailing this front-steering iceboat. It is simple to build, costs less than $28 including sail, and most important of all, will not spin on the ice. Safety is the keynote, since this type cannot possibly spin out of control. With the rig scientifically balanced by the designers, capsizing is reduced to a minimum.

This forward runner craft, the latest thing in iceboats, is cat-rigged (one sail) and has 75 sq. feet of sail. It can easily be sailed at up to 50 miles an hour, perhaps more, in an 18 mile wind. Two persons can be carried in the cockpit and two more on the runnerplank adjoining it.

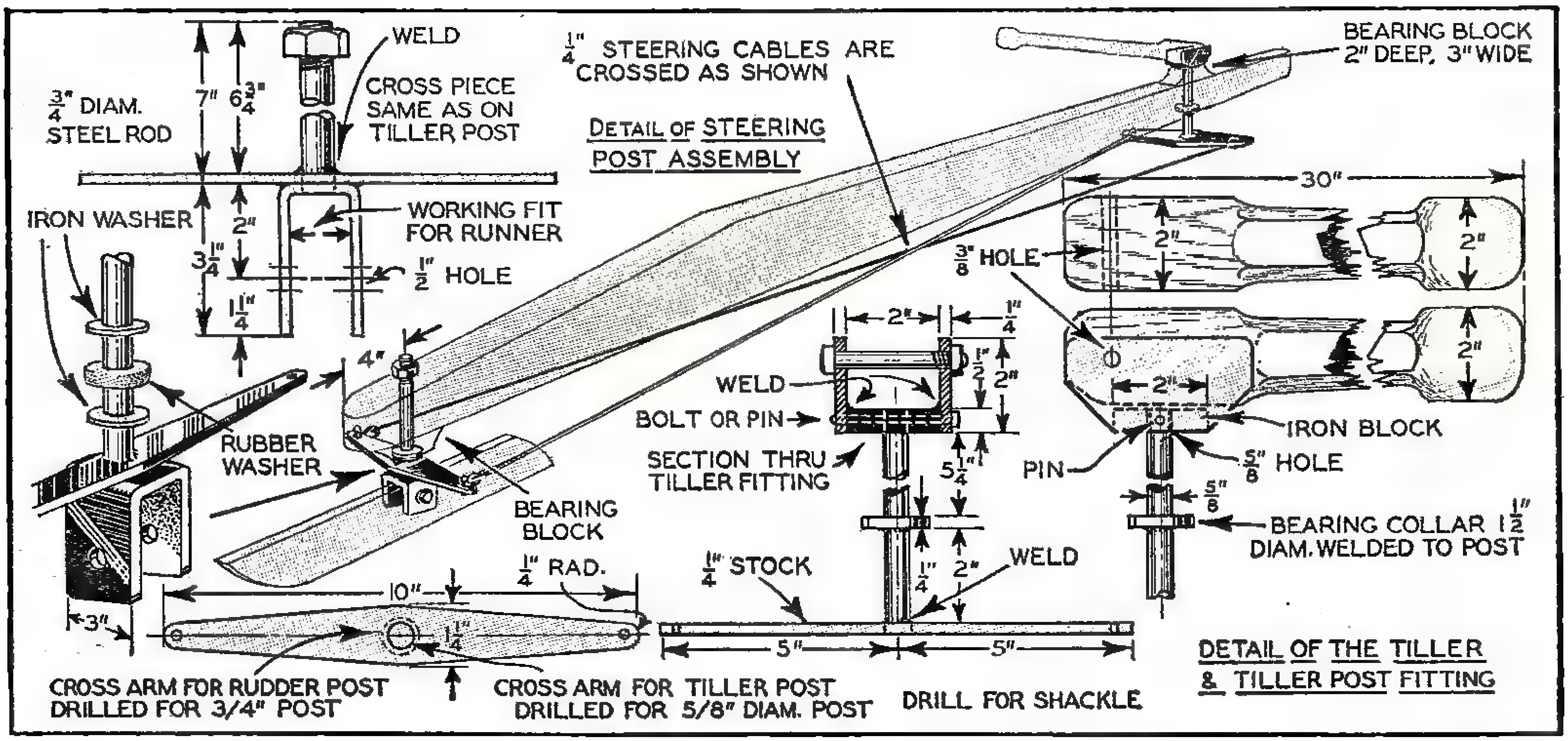
By carefully following instructions you will not only have a handsome boat, but one which will stand up for many years of thrilling winter sailing.

The use of clear, straight-grained spruce throughout is advised. If spruce is not obtainable, pine, but preferably fir may be substituted. Spruce and fir have greater strength and flexibility to absorb jarring on unsmooth ice. Use only brass screws when necessary to use screws. Nails should be avoided.

The plans show a criss-cross affair, the reverse of the more familiar Hudson River type which is steered with the rudder at the stern. A solid backbone 13′x6″x3″ should be tapered at both ends from the maststep where greater thickness is needed to withstand the down-pressure of the mast. The runnerplank is 10′ long, 10″ wide and 1¾″ thick. The mast measurements are 18′x4½″x2½″; it is raked or tilted aft two feet off perpendicular.

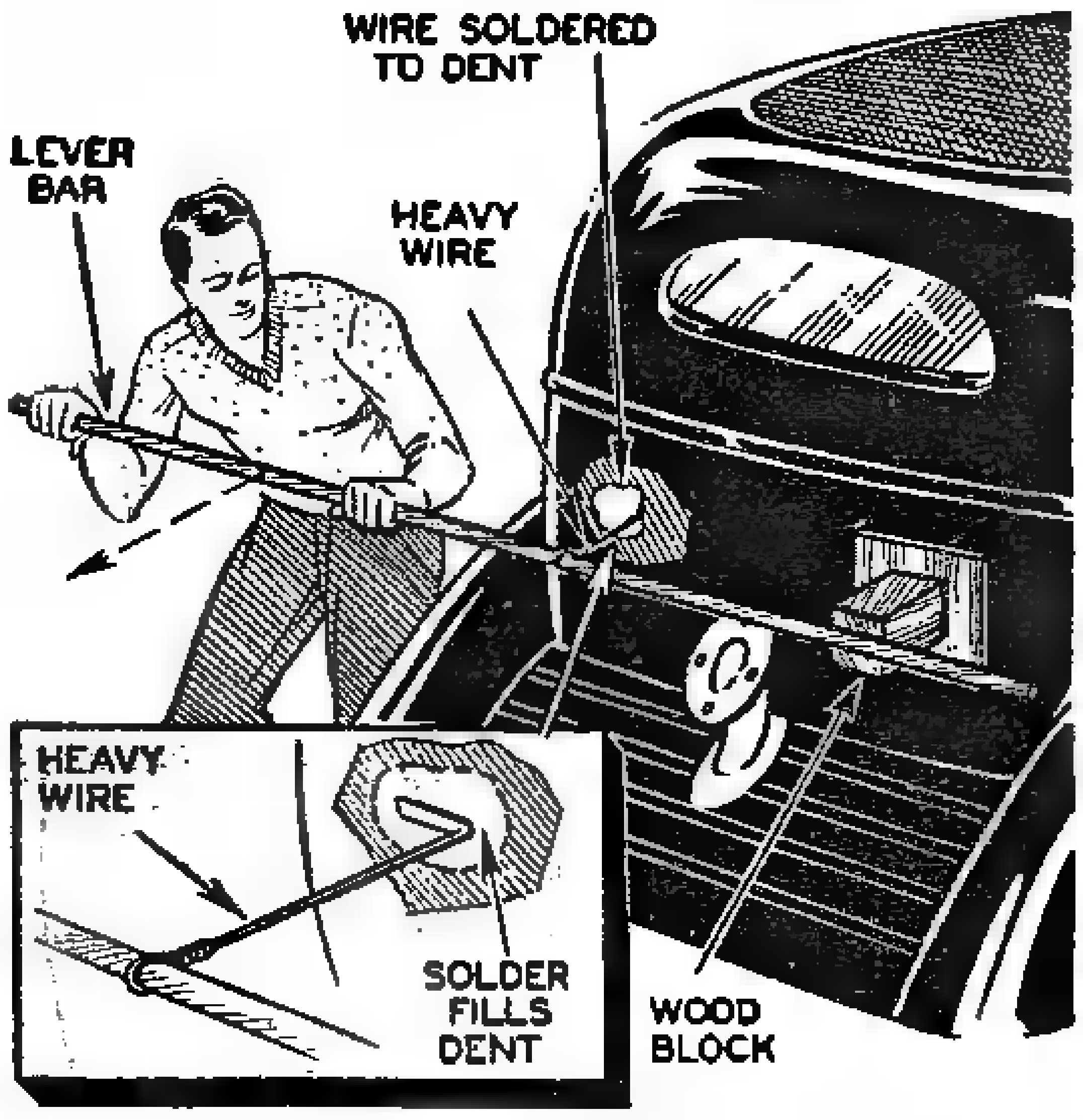
The bottom of the cockpit should be of half-inch plywood, 6 feet long, two feet

(Continued on page 126)


WELD
$\frac{1}{4}$" STEERING CABLES ARE CROSSED AS SHOWN
BEARING BLOCK 2" DEEP, 3" WIDE
$\frac{3}{4}$" DIAM. STEEL ROD
7"
$6\frac{3}{4}$"
CROSS PIECE SAME AS ON TILLER POST
DETAIL OF STEERING POST ASSEMBLY
30"
IRON WASHER
2"
$3\frac{1}{4}$"
WORKING FIT FOR RUNNER
$\frac{1}{2}$" HOLE
$1\frac{1}{4}$"
$\frac{3}{8}$" HOLE
2"
2"
2"
4"
2"
$\frac{1}{4}$"
$\frac{1}{2}$"
2"
WELD
BOLT OR PIN
2"
IRON BLOCK
RUBBER WASHER
SECTION THRU TILLER FITTING
$5\frac{1}{4}$"
PIN
$\frac{5}{8}$" HOLE
$\frac{5}{8}$"
BEARING BLOCK
BEARING COLLAR $1\frac{1}{2}$" DIAM. WELDED TO POST
$\frac{1}{4}$" RAD.
$\frac{1}{4}$" STOCK
$\frac{1}{4}$"
2"
WELD
10"
3"
$1\frac{1}{4}$"
5"
5"
DETAIL OF THE TILLER & TILLER POST FITTING
CROSS ARM FOR RUDDER POST DRILLED FOR 3/4" POST
CROSS ARM FOR TILLER POST DRILLED FOR 5/8" DIAM. POST
DRILL FOR SHACKLE

Rudder post and tiller details. Crossed steering cables are necessary with front-steering runner to permit tiller to move in same direction as operator on turns. Hardwood tiller swings up or down in bearing block, which in turn bolts to tiller post.

AUTOMOBILE REPAIR HINTS

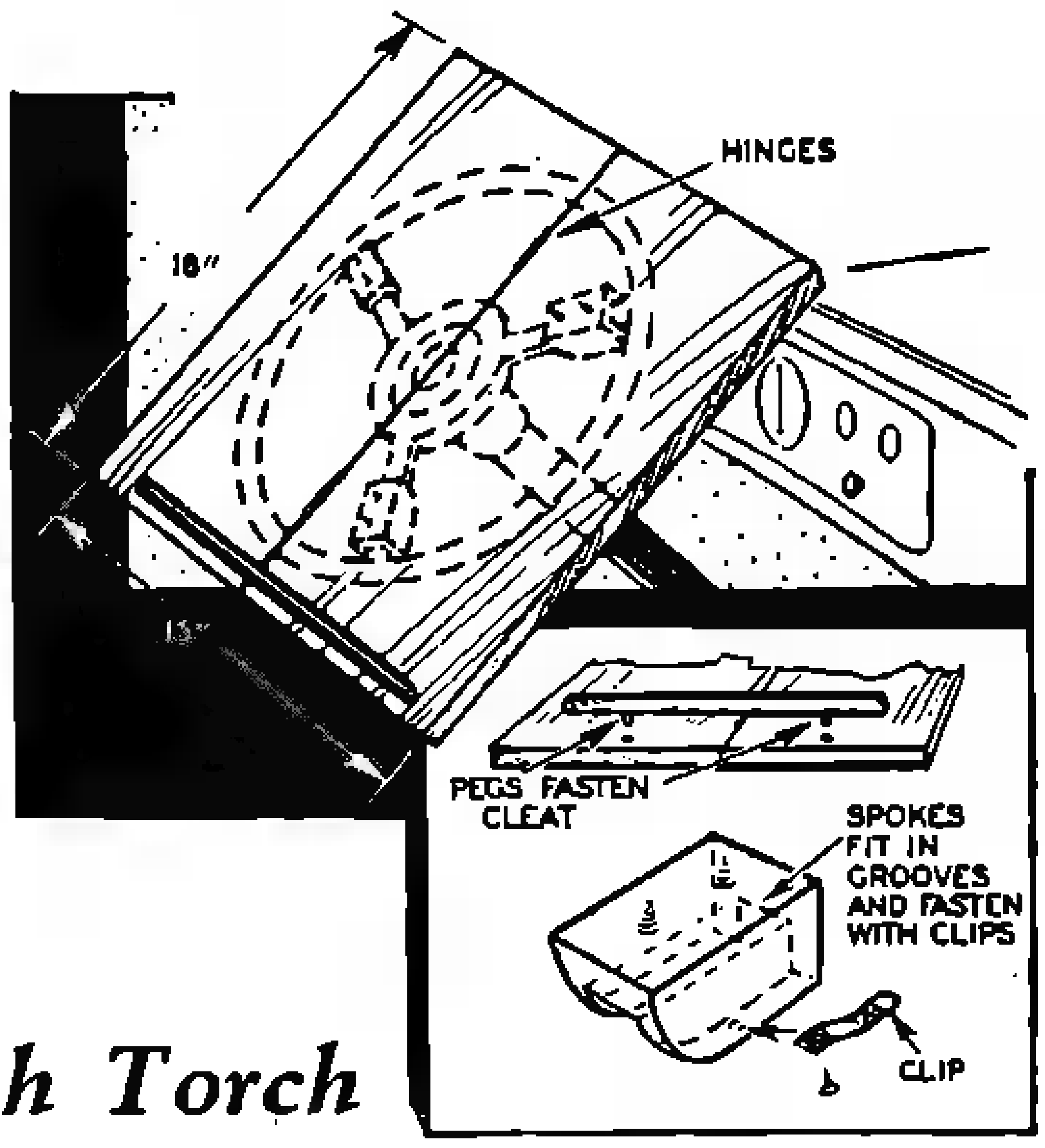

WIRE SOLDERED TO DENT
LEVER BAR
HEAVY WIRE
HEAVY WIRE
SOLDER FILLS DENT
WOOD BLOCK

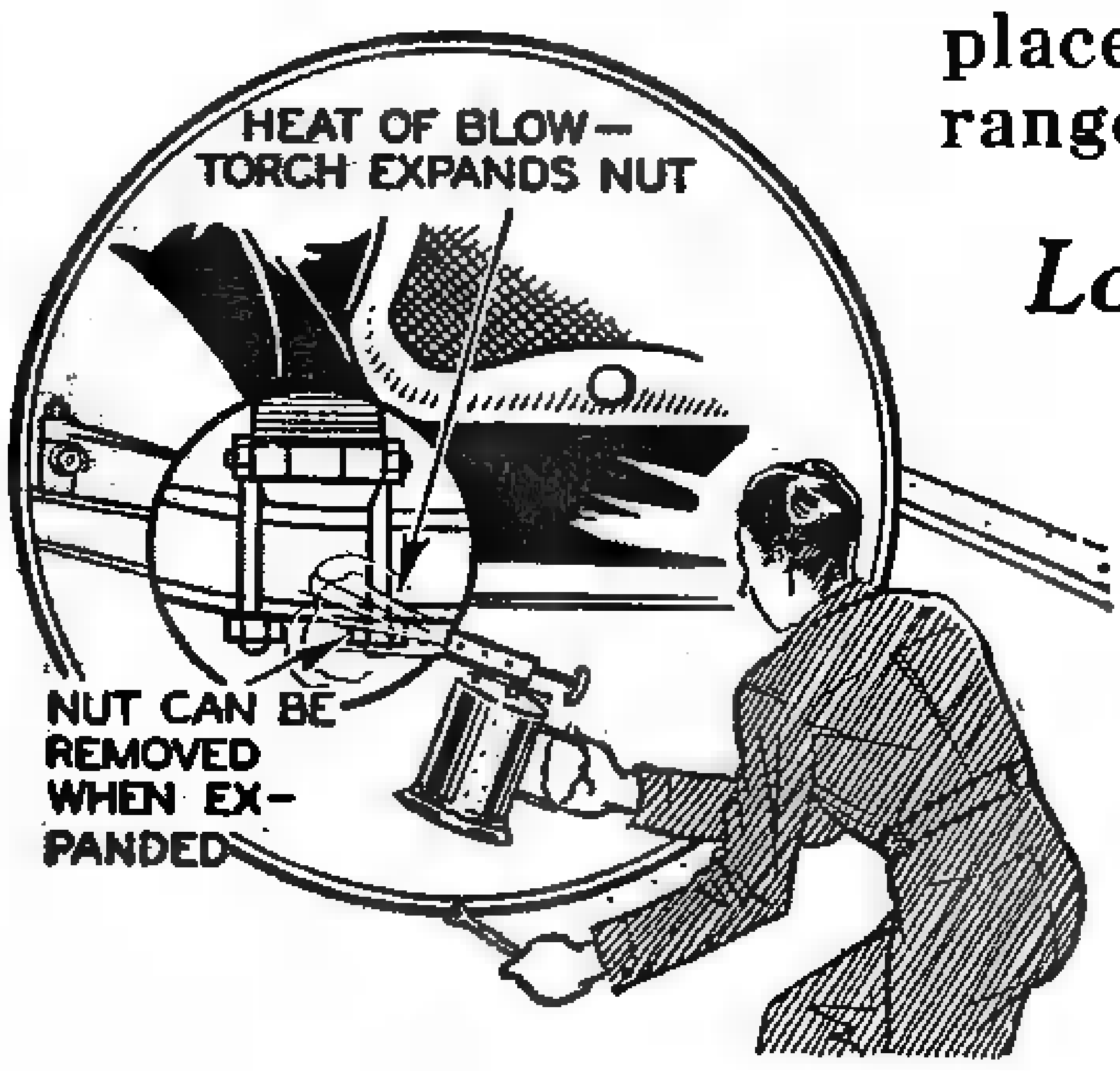
Solder-lever Kink Removes Auto Body Dents

THE removal of dents in parts of the auto body which are not readily accessible from the inside presents a different problem. Remove enamel from the damaged area, sandpaper, and apply a light coating of solder. To the center of the hollow solder a strong wire bent at right angles. Form a hook in the free end of the wire and insert a bar to act as a lever; lifting on this should snap the dent back in place. Remove the solder with a blow torch and touch up with enamel. Dents in refrigerators can be repaired in the same manner.—Curtis H. Wilson.

Handy Desk Fits Over Steering Wheel

MANY uses will be found for this handy little hinged desk which can be slipped over the steering wheel, ready for use, in a jiffy. The hinged arrangement enables the desk to be stored in some odd corner of the car when not in use. Three grooved chocks, fastened to the back of the desk boards with screws, fit down over the spokes of the steering wheel. Spring clips swinging over the slots in the chocks hold the entire assembly snugly in place. The chocks must be arranged to fit.—J. A. Emmett.


HINGES
18"
15"
PEGS FASTEN CLEAT
SPOKES FIT IN GROOVES AND FASTEN WITH CLIPS
CLIP

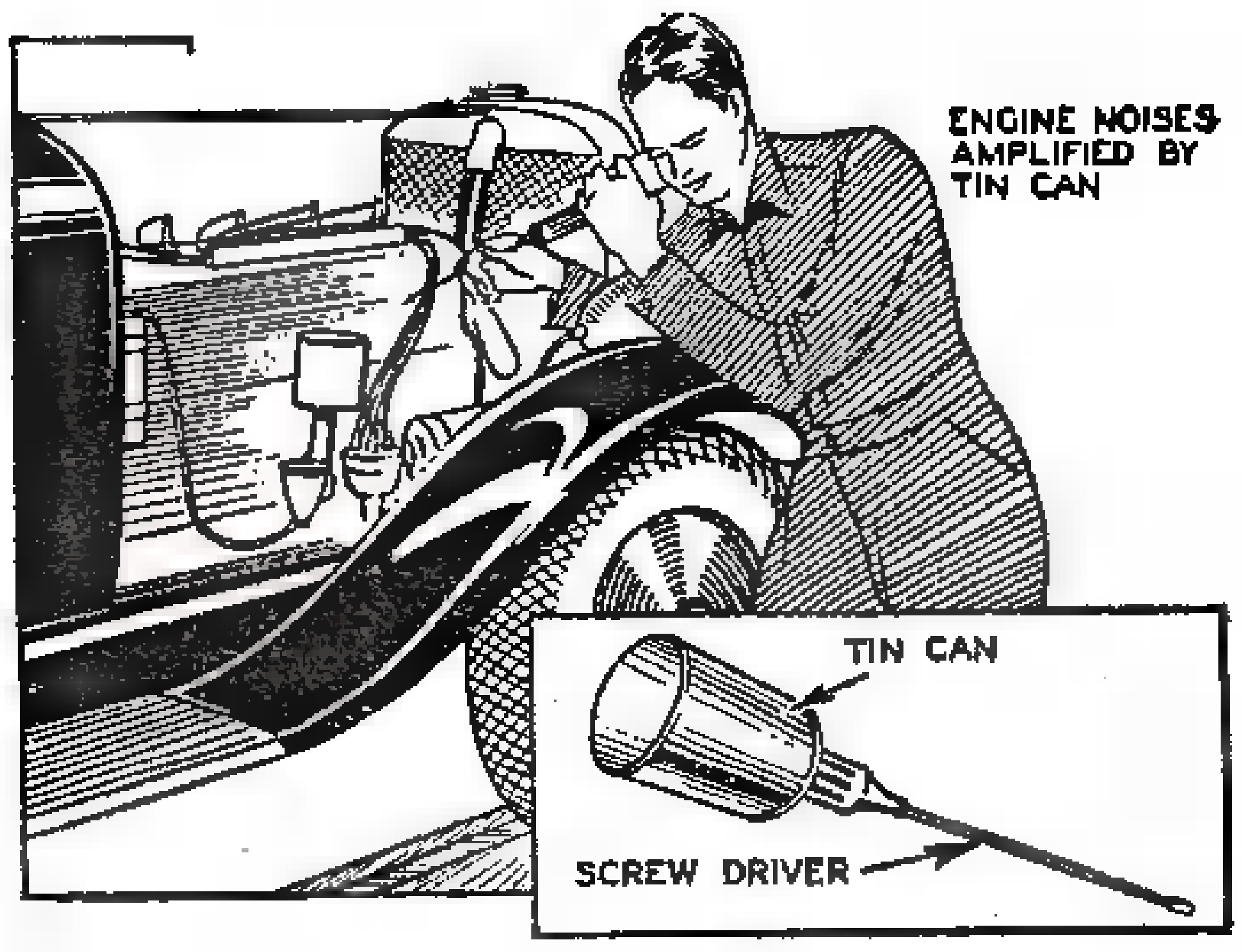

HEAT OF BLOW-TORCH EXPANDS NUT
NUT CAN BE REMOVED WHEN EXPANDED

Loosen Rusted Nuts With Torch

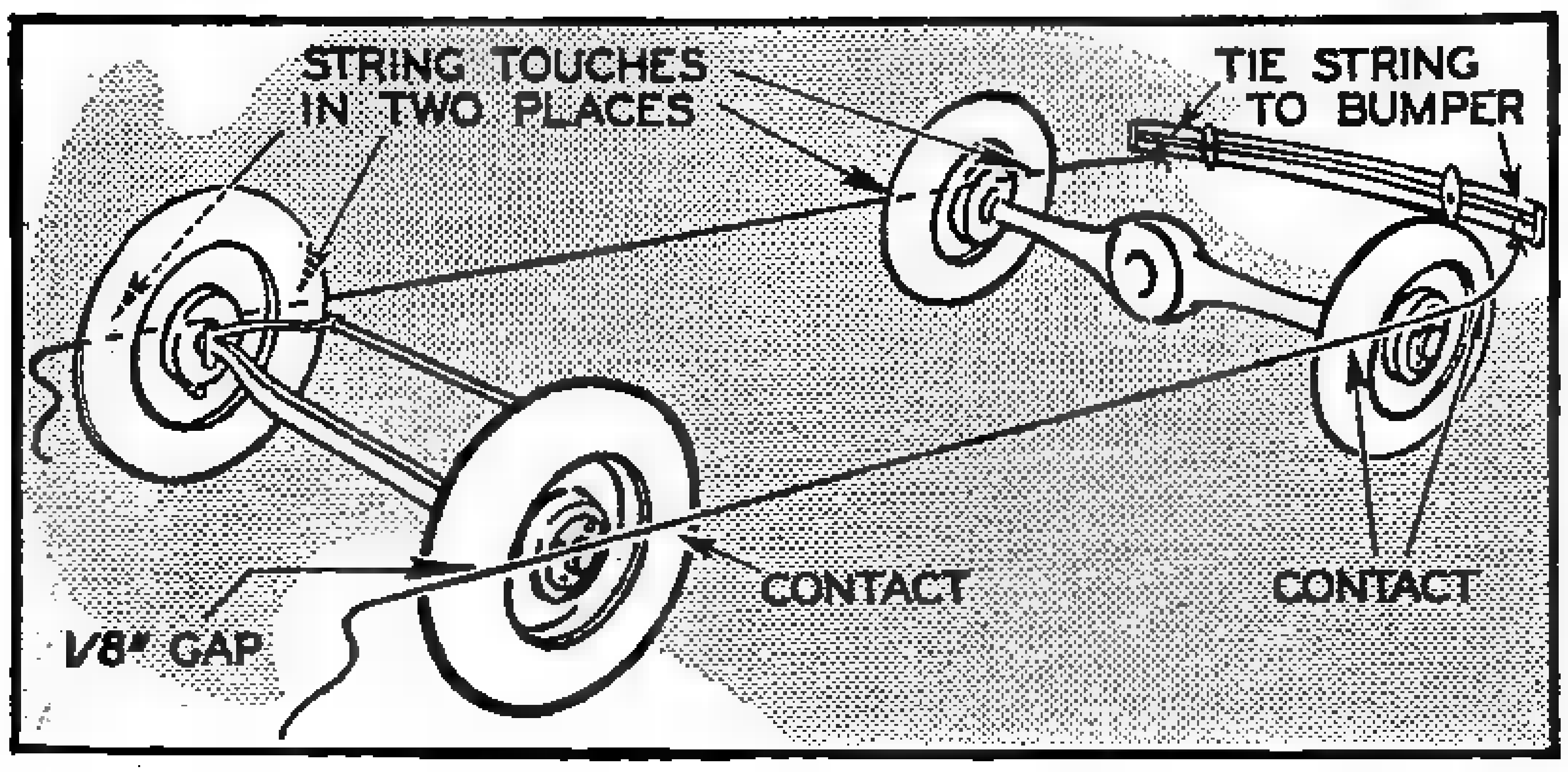
NUTS that cannot be loosened by a wrench or by dousing with kerosene will in most cases come off easily after being heated with a blowtorch. Direct the flame on the nut until the metal has expanded away from the bolt. A tight-fitting wrench should be used when working on a heated nut, to prevent damage to the softened metal. Bolts with screw-type heads are removed in the same manner. It is usually a layer of rust which binds nut and bolt together.—John S. Carnes.

Locating Engine Noises With Screwdriver

WITH this simple device the sounds made by various parts of an automobile engine can be isolated and listened to. Troubles due to worn valve springs, loose timing gears or worn bearings are accurately spotted despite the noise of the engine. Get a long screwdriver and a tin can with one end open. Touch the screwdriver blade to the engine, rest the bottom of the can on its handle, and listen at the open end of the can. You'll be surprised at the queer noises.—R. F. Jonesik.

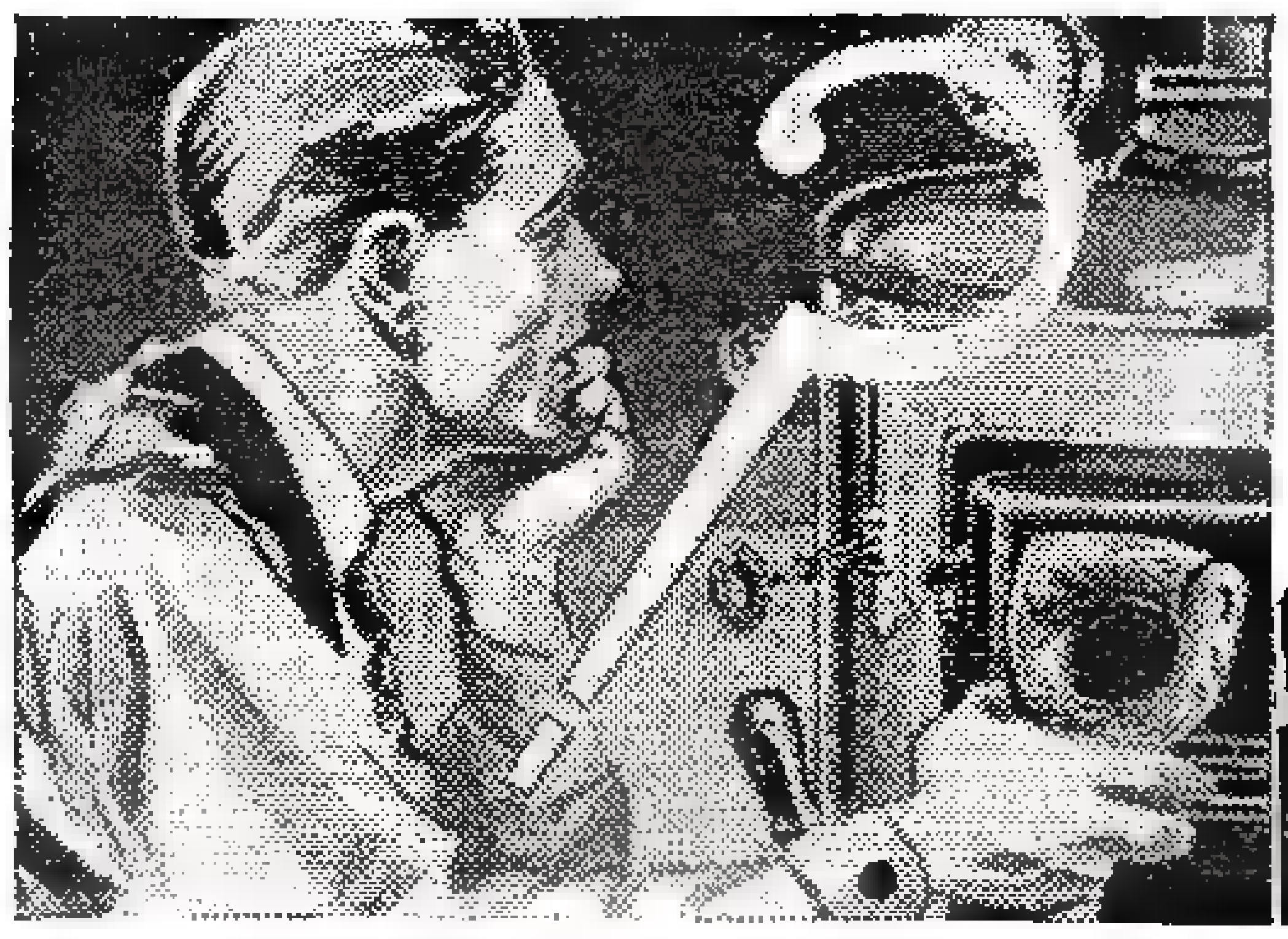

ENGINE NOISES AMPLIFIED BY TIN CAN
TIN CAN
SCREW DRIVER

Check Front Wheel Alignment Regularly to Prevent Excess Tire Wear


STRING TOUCHES IN TWO PLACES
TIE STRING TO BUMPER
CONTACT
CONTACT
1/8" GAP

MIS-ALIGNMENT of front wheels means hard steering and excessive tire wear. To check "toe-in," jack up front axle and spot tire with chalk to mark high spots due to wheel wobble. Lower the jack so that high spots are at the bottom. Stretch string across wheels on one side just under the hub caps and adjust to make front wheel parallel with rear. If the "toe-in" is correct, string on other side will touch front tire at two places.—R. F. Jennings.

Do You Know How to Run a Furnace?



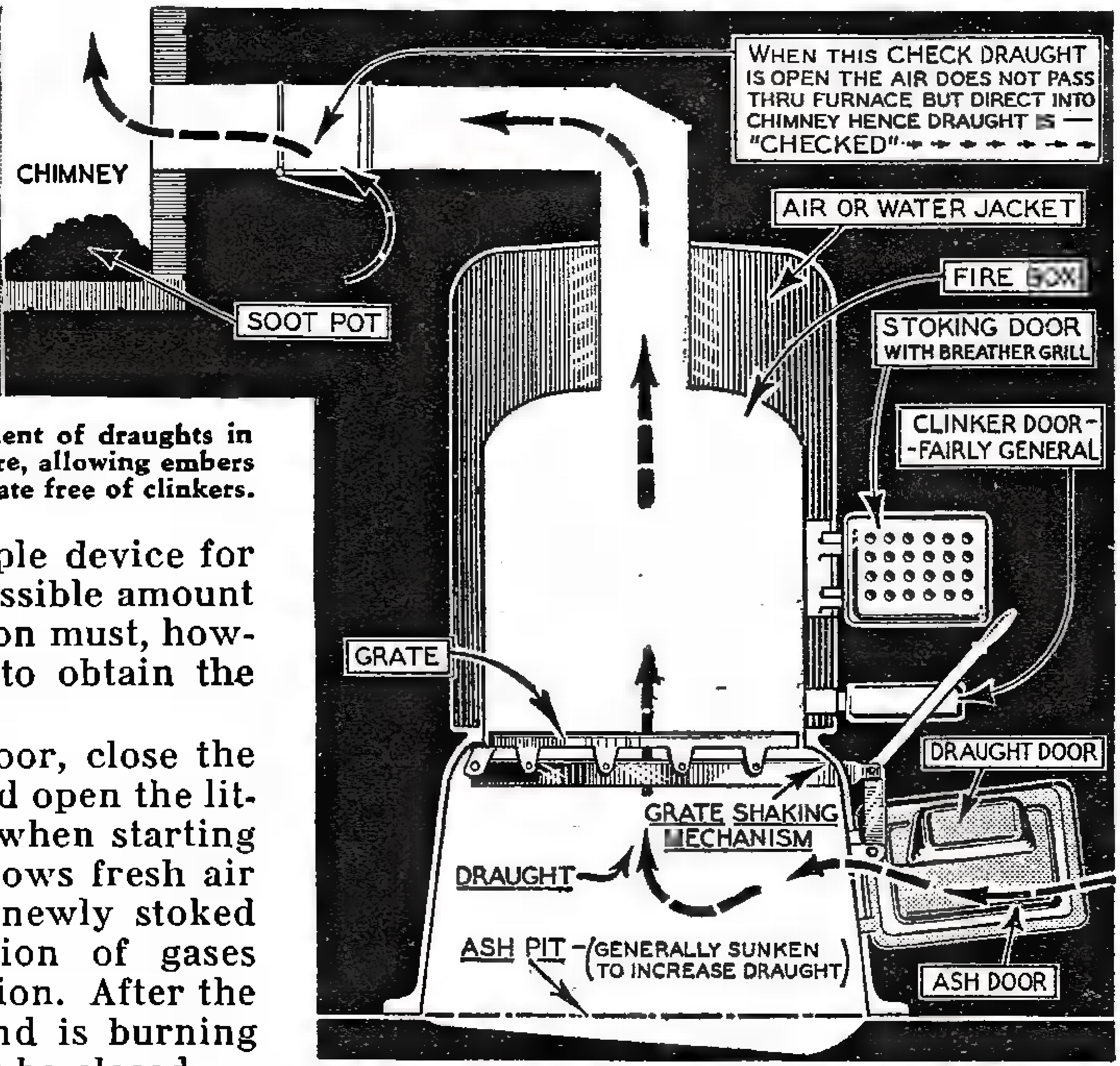

WHEN THIS CHECK DRAUGHT IS OPEN THE AIR DOES NOT PASS THRU FURNACE BUT DIRECT INTO CHIMNEY HENCE DRAUGHT IS — "CHECKED"
CHIMNEY
SOOT POT
AIR OR WATER JACKET
FIRE BOX
STOKING DOOR WITH BREATHER GRILL
CLINKER DOOR—FAIRLY GENERAL
GRATE
DRAUGHT DOOR
GRATE SHAKING MECHANISM
DRAUGHT
ASH PIT — (GENERALLY SUNKEN TO INCREASE DRAUGHT)
ASH DOOR

DIAGRAM OF TYPICAL FURNACE SHOWING PARTS

Diagram at right shows typical arrangement of draughts in furnace. Use plenty of wood in starting fire, allowing embers to form before throwing on coal. Keep grate free of clinkers.

THE home furnace is a simple device for obtaining the maximum possible amount of heat from coal. Its operation must, however, be clearly understood to obtain the best results.

Open the lower draught door, close the check draught in the pipe, and open the little grill on the stoking door when starting a fire. This breather grill allows fresh air to flow across the top of a newly stoked fire, preventing the formation of gases which might cause an explosion. After the coal has stopped smoking and is burning nicely the breather door may be closed.

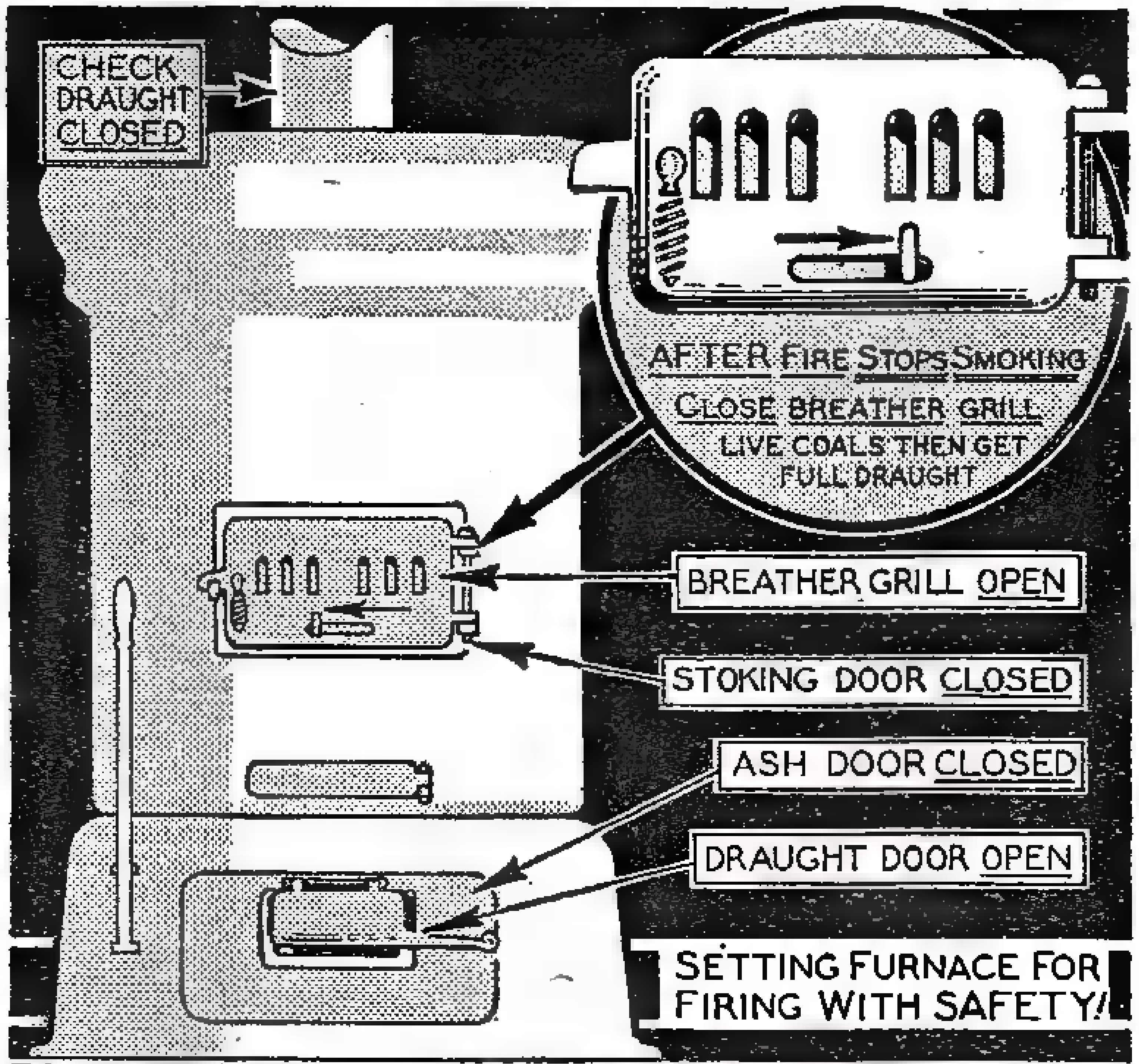
With the check draught closed and the draught door open, build up the fire until it is level with the stoking door. You cannot heat a house economically by carrying a low fire; it is hard on the grates, and burns fuel so hotly that clinkers form.

Furnace Has Three Draught Controls

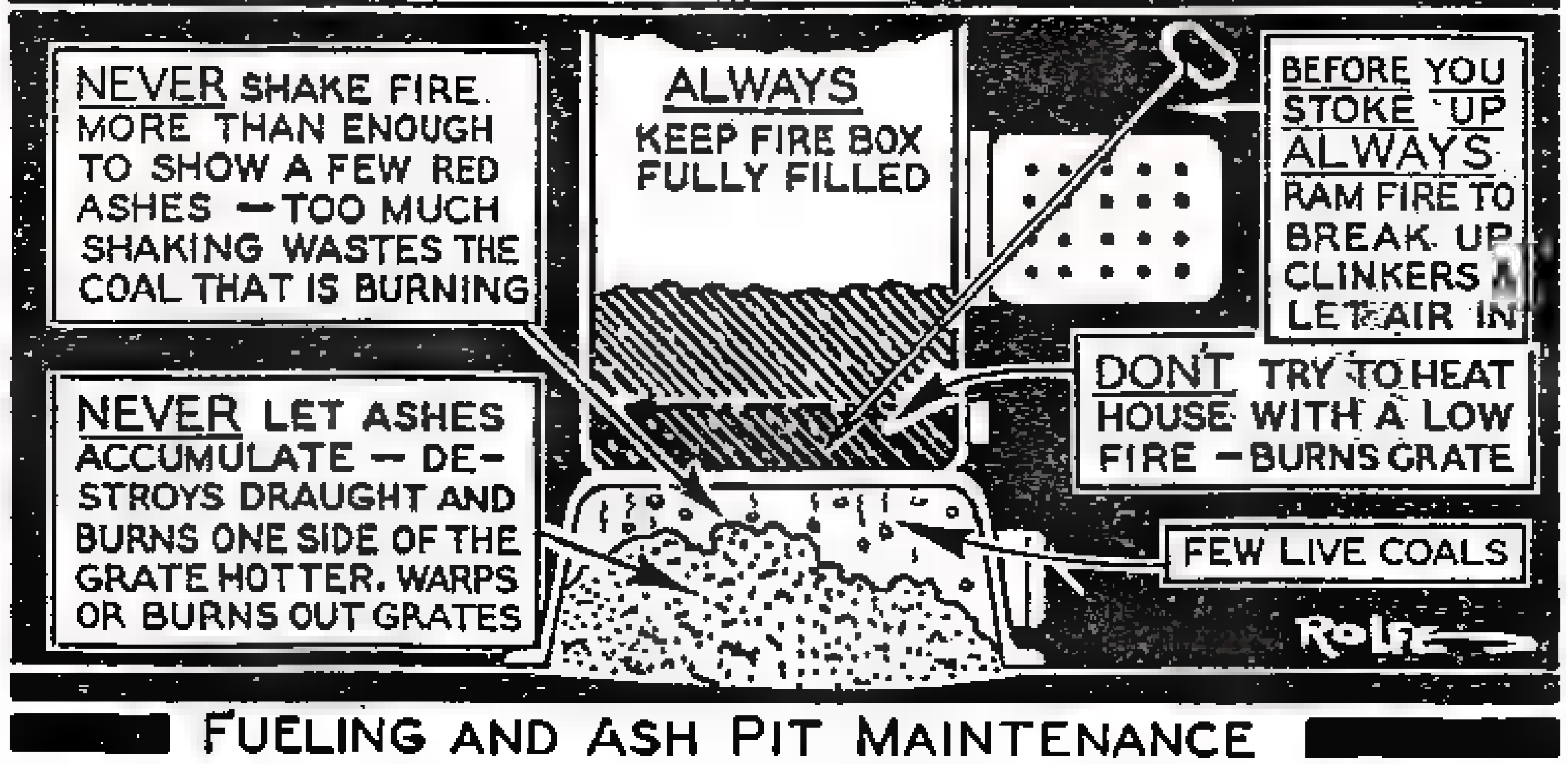
The bottom draught door through which the air passes to the ash pit is an important check. Closed, only a small part of air can get up through the fire box. If you wish to check the fire further, open the check draught located in the stove pipe between the furnace and the chimney. This draught allows air to go up the chimney without passing through the fire.

With the door draught open and the check draught closed, the fire is in position to burn best. On gusty days, when the wind creates an unnatural draught and the fire is hard to control, there is a damper in the chimney which can be partly closed to further restrict air passage. This damper should normally be left wide open, except perhaps in warm weather when the fire cannot be checked in any other way.

At night the fire should be well shaken down, the fresh coal piled on, the breather grill left open, and ashes piled atop the fire to restrict the rate of burning. The check draught is left open, but never at night or at any time after freshly stoking the fire, should the check damper be even partially closed.


CHECK DRAUGHT CLOSED
AFTER FIRE STOPS SMOKING CLOSE BREATHER GRILL. LIVE COALS THEN GET FULL DRAUGHT
BREATHER GRILL OPEN
STOKING DOOR CLOSED
ASH DOOR CLOSED
DRAUGHT DOOR OPEN

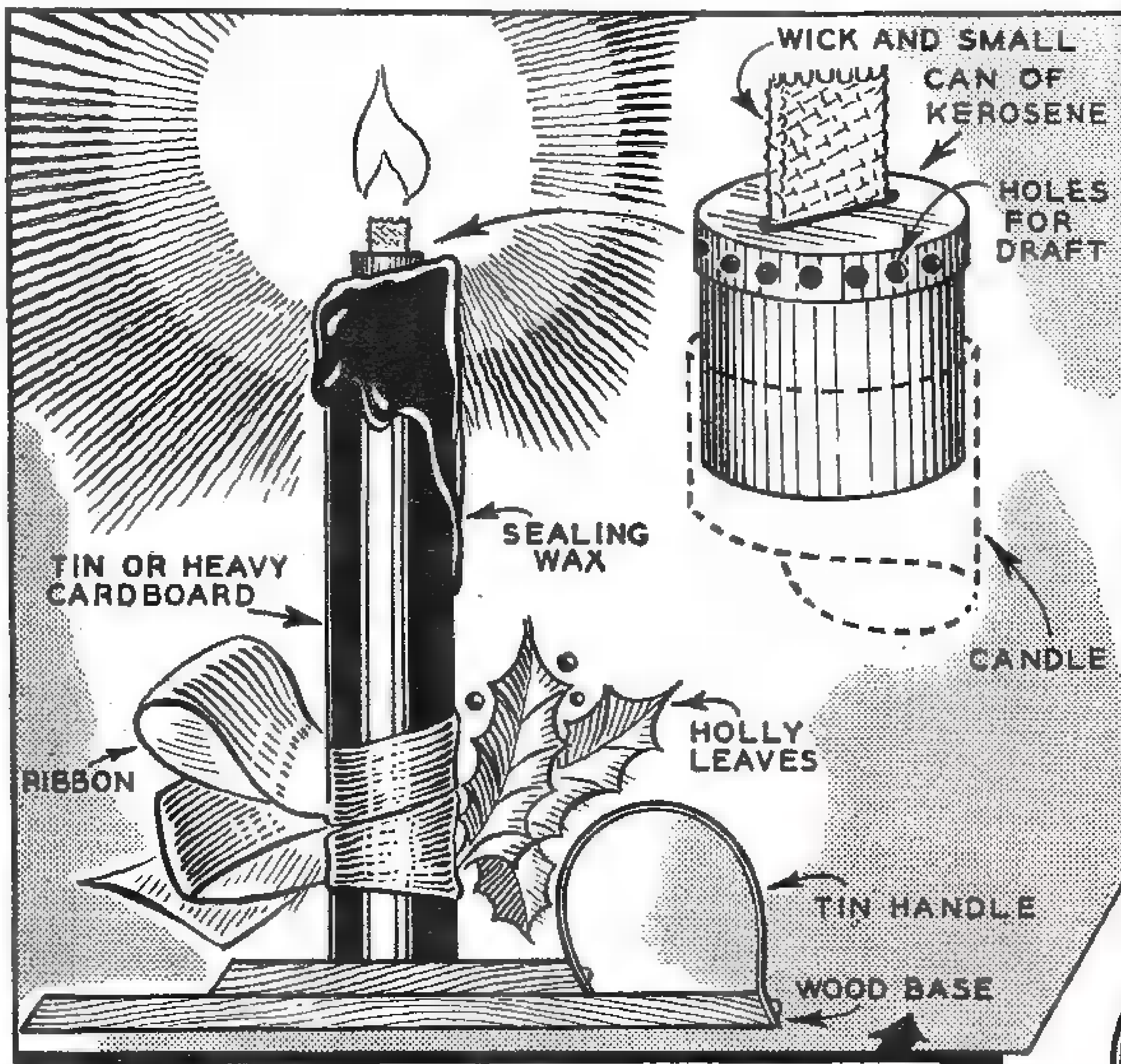
SETTING FURNACE FOR FIRING WITH SAFETY!


NEVER SHAKE FIRE. MORE THAN ENOUGH TO SHOW A FEW RED ASHES —TOO MUCH SHAKING WASTES THE COAL THAT IS BURNING
ALWAYS KEEP FIRE BOX FULLY FILLED
BEFORE YOU STOKE UP ALWAYS RAM FIRE TO BREAK UP CLINKERS & LET AIR IN
NEVER LET ASHES ACCUMULATE — DESTROYS DRAUGHT AND BURNS ONE SIDE OF THE GRATE HOTTER. WARPS OR BURNS OUT GRATES
DON'T TRY TO HEAT HOUSE WITH A LOW FIRE —BURNS GRATE
FEW LIVE COALS
ROLFE

FUELING AND ASH PIT MAINTENANCE

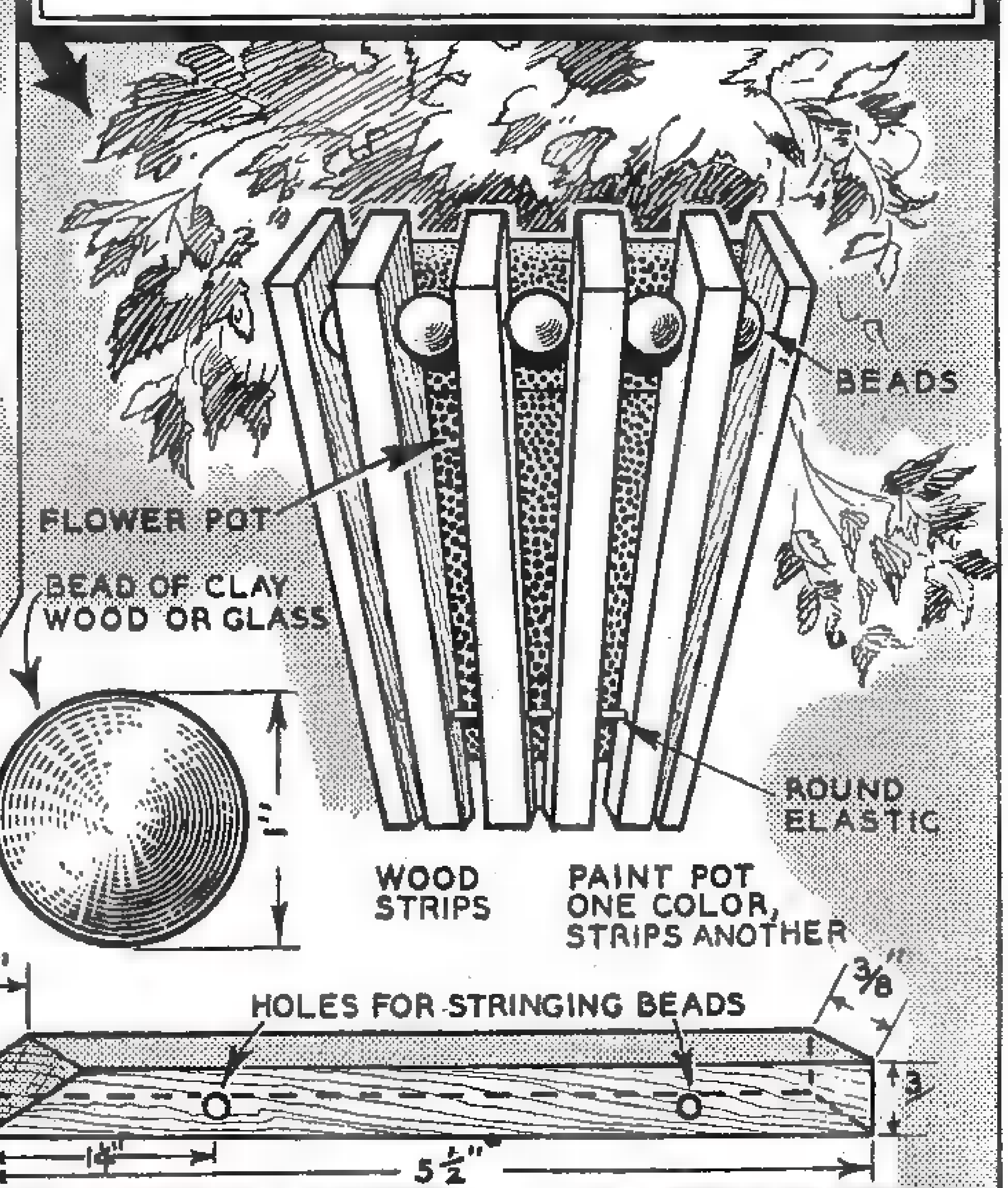
When starting up furnace in fall see that all door joints seat tightly. Air leaks can be located with candle flame, and closed with furnace cement. Steel wool stuffed around shaker rod will reduce leakage at this point. Check damper should be left alone except on days when you absolutely have to reduce draught. Open breather grill only when starting up.

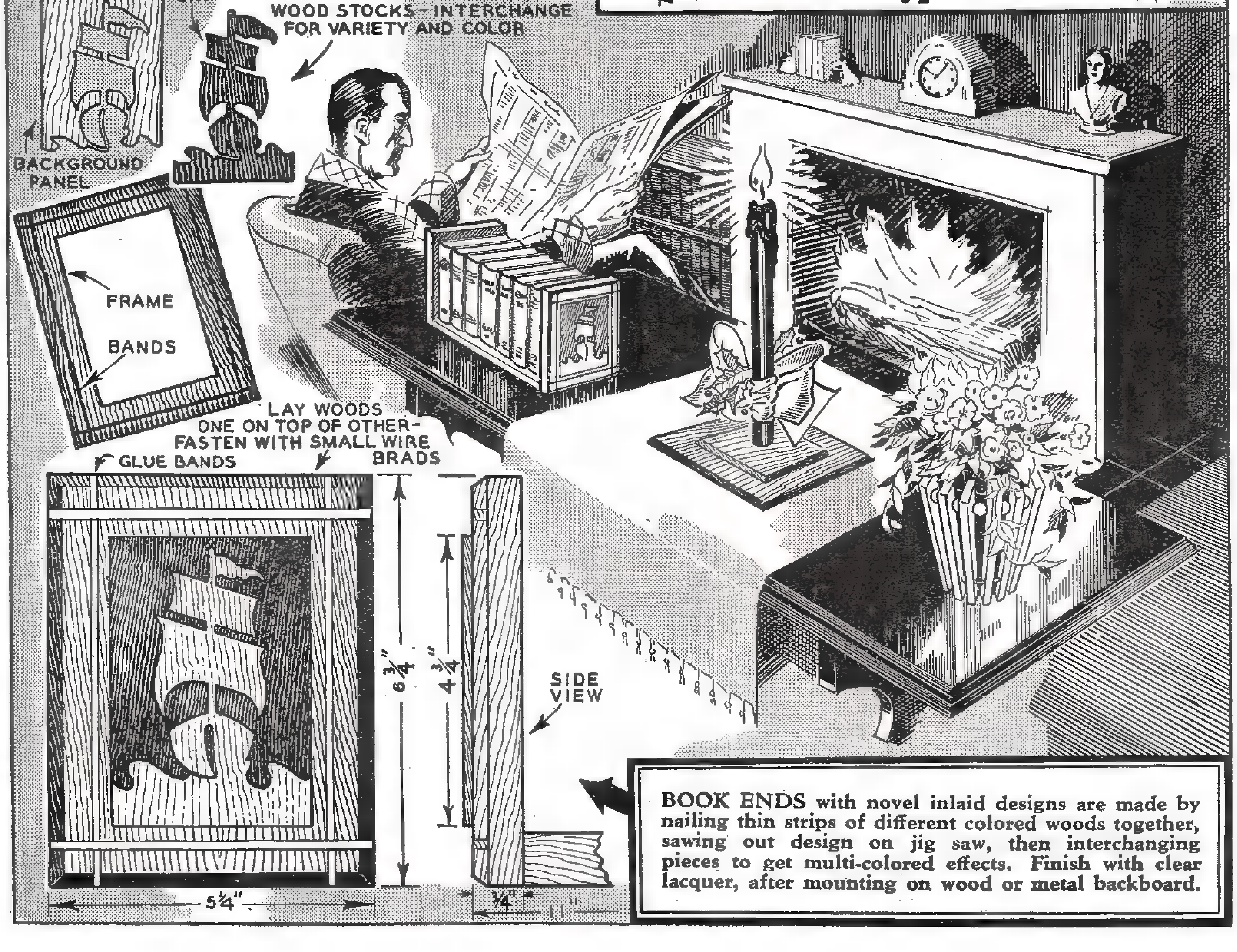
Six Novel SUGGESTIONS


WICK AND SMALL CAN OF KEROSENE
HOLES FOR DRAFT
SEALING WAX
TIN OR HEAVY CARDBOARD
CANDLE
HOLLY LEAVES
RIBBON
TIN HANDLE
WOOD BASE

EVERLASTING CANDLE burns for hours with bright flame, yet always is same height. Glue cardboard or tin cylinder 24″ long by 4″ thick to wood base, set in kerosene tin with wick, and finish in red enamel, ribbon, and white wax.

FLOWER POT COVER made from small pieces of wood will beautify unsightly clay pots, giving novel setting for any plant. Drill holes in carefully beveled wood strips, assemble with beads and elastic, and apply lacquer or paint.


BEADS
FLOWER POT
BEAD OF CLAY WOOD OR GLASS
1″
ROUND ELASTIC
WOOD STRIPS
PAINT POT ONE COLOR, STRIPS ANOTHER
3/4″
3/8″
HOLES FOR STRINGING BEADS
3
1½″
5½″

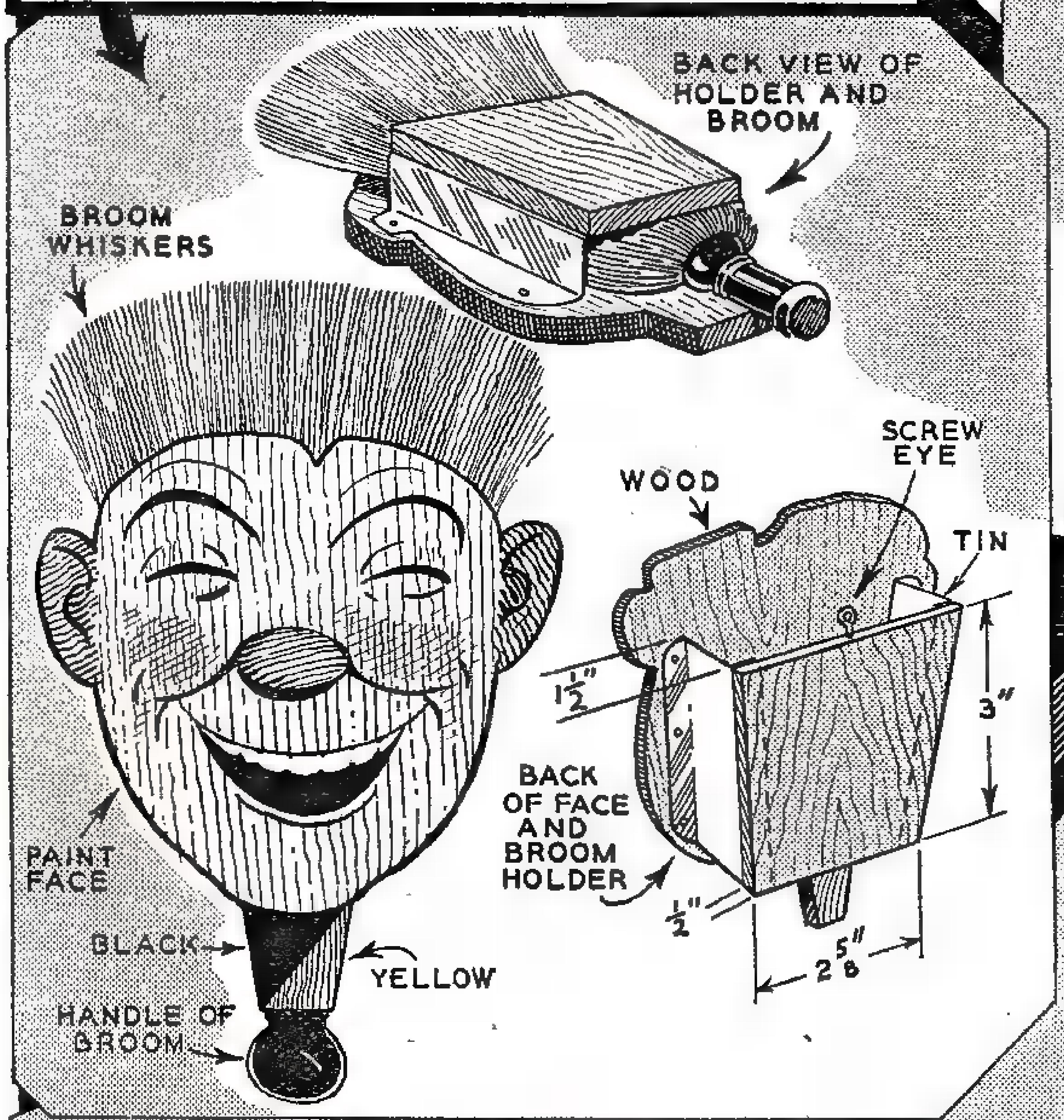

SHIP
CUT PARTS FROM 3 DIFFERENT WOOD STOCKS - INTERCHANGE FOR VARIETY AND COLOR
BACKGROUND PANEL
FRAME
BANDS
LAY WOODS ONE ON TOP OF OTHER-FASTEN WITH SMALL WIRE BRADS
GLUE BANDS
6¾″
4¾″
SIDE VIEW
5¼″
¼″
1″

BOOK ENDS with novel inlaid designs are made by nailing thin strips of different colored woods together, sawing out design on jig saw, then interchanging pieces to get multi-colored effects. Finish with clear lacquer, after mounting on wood or metal backboard.

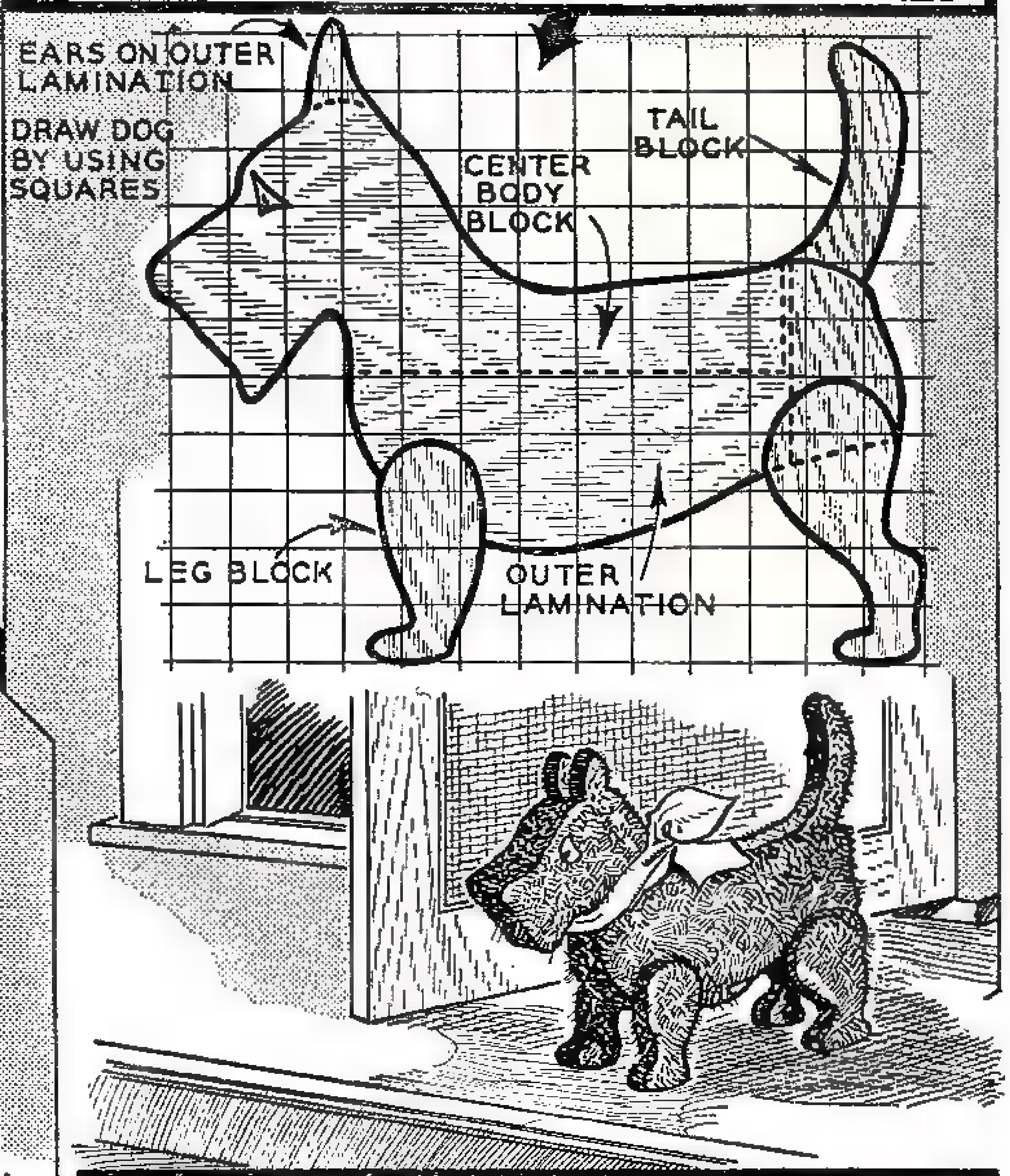
for CHRISTMAS GIFTS

Add that personal touch to Christmas gifts this year by making them in your own workshop. Among the plans shown here are appropriate gifts for family or friends—and their cost will be very moderate. Finished in gay lacquer, they spread real holiday cheer to all.

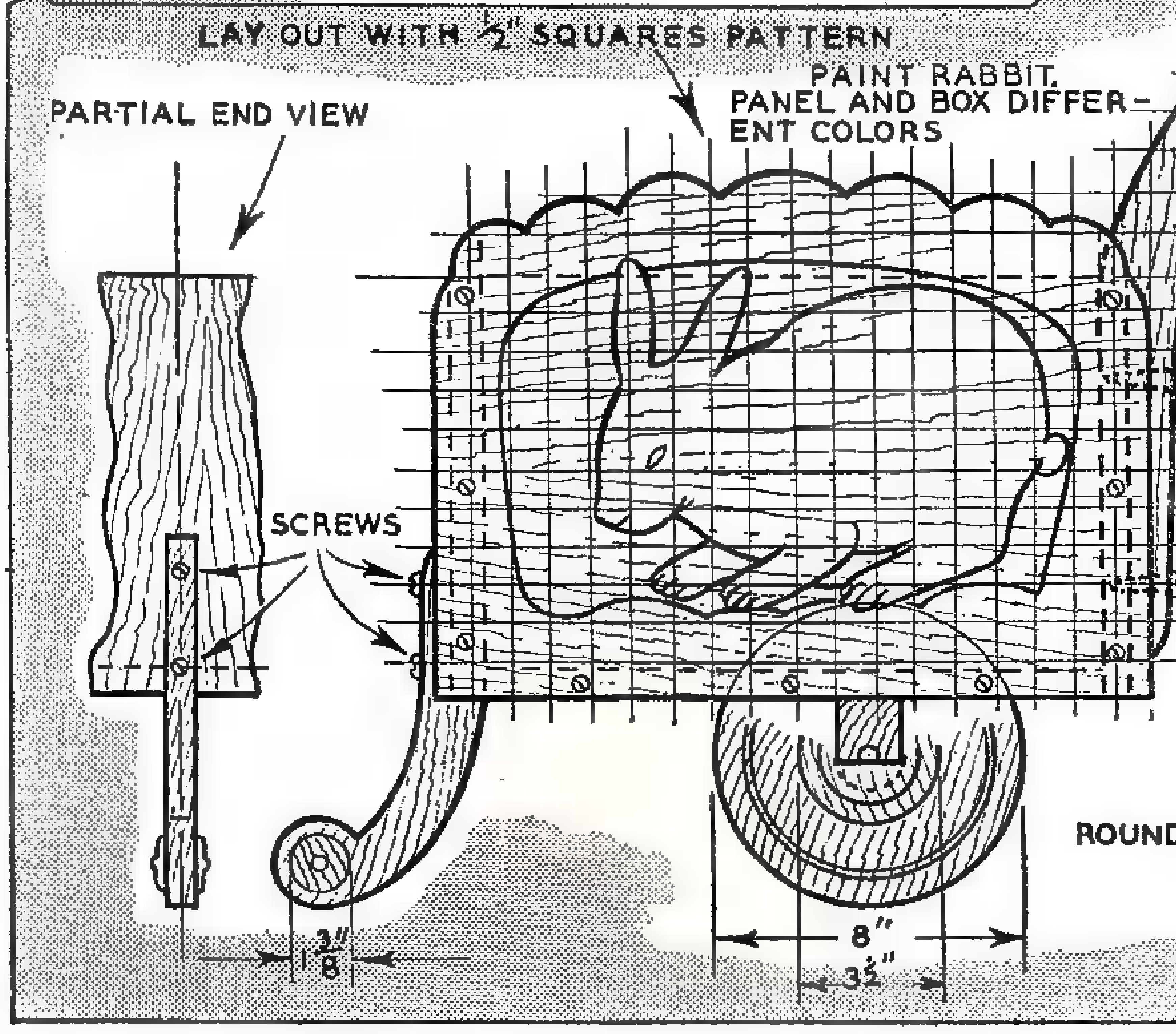
WHISK BROOM HOLDER with comic face brings many a chuckle from users. Paint features in with black paint, then add dashes of color to mouth, nose, and ears. Hang by screw eye on nail in wall.

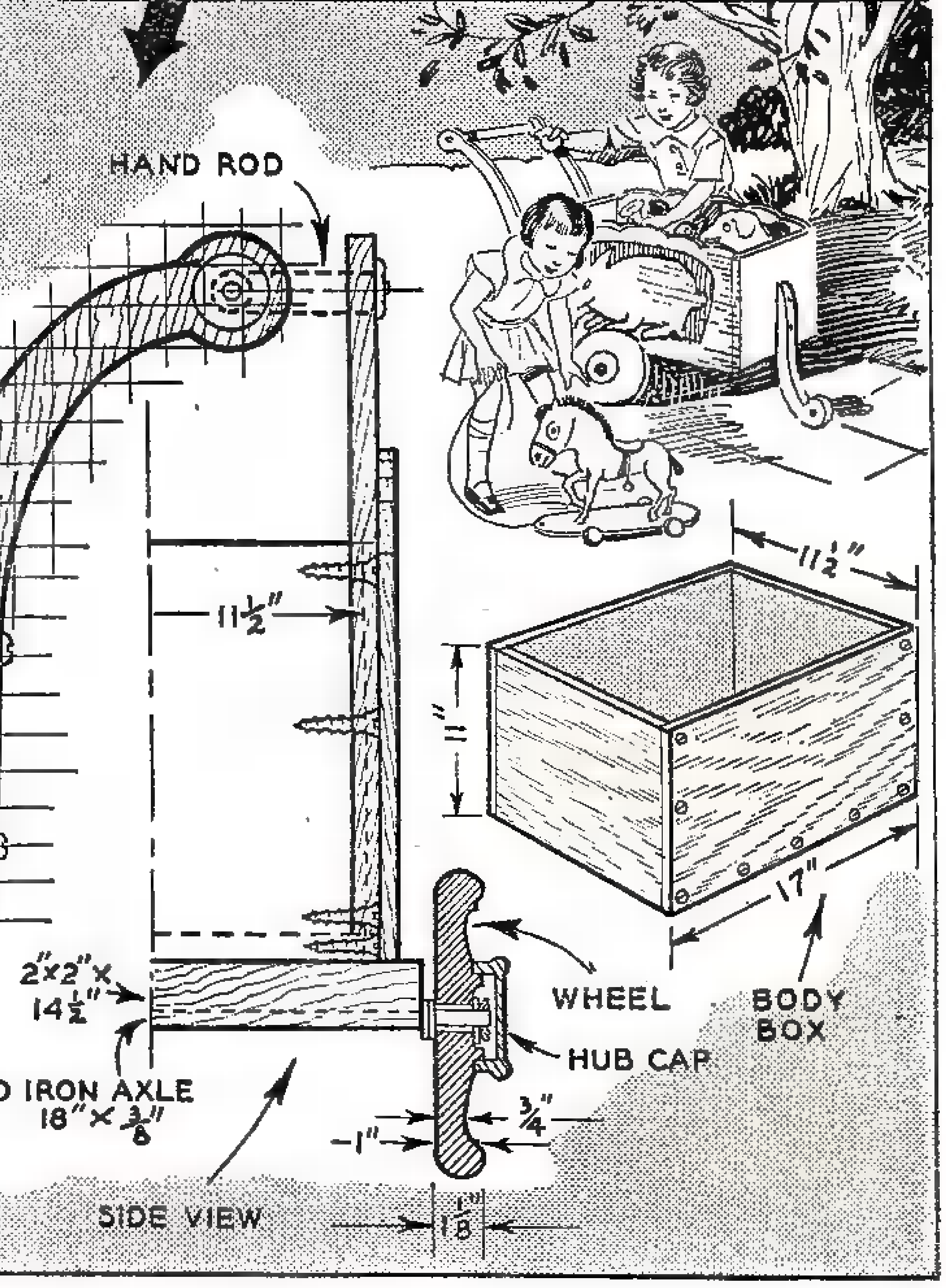

BACK VIEW OF HOLDER AND BROOM
BROOM WHISKERS
WOOD
SCREW EYE
TIN
1½"
3"
BACK OF FACE AND BROOM HOLDER
½"
2⅝"
PAINT FACE
BLACK
YELLOW
HANDLE OF BROOM

"SCOTTIE" DOOR STOP is cut from layers of plywood, then glued together and finished with heavy coat of plastic paint textured to represent fur.

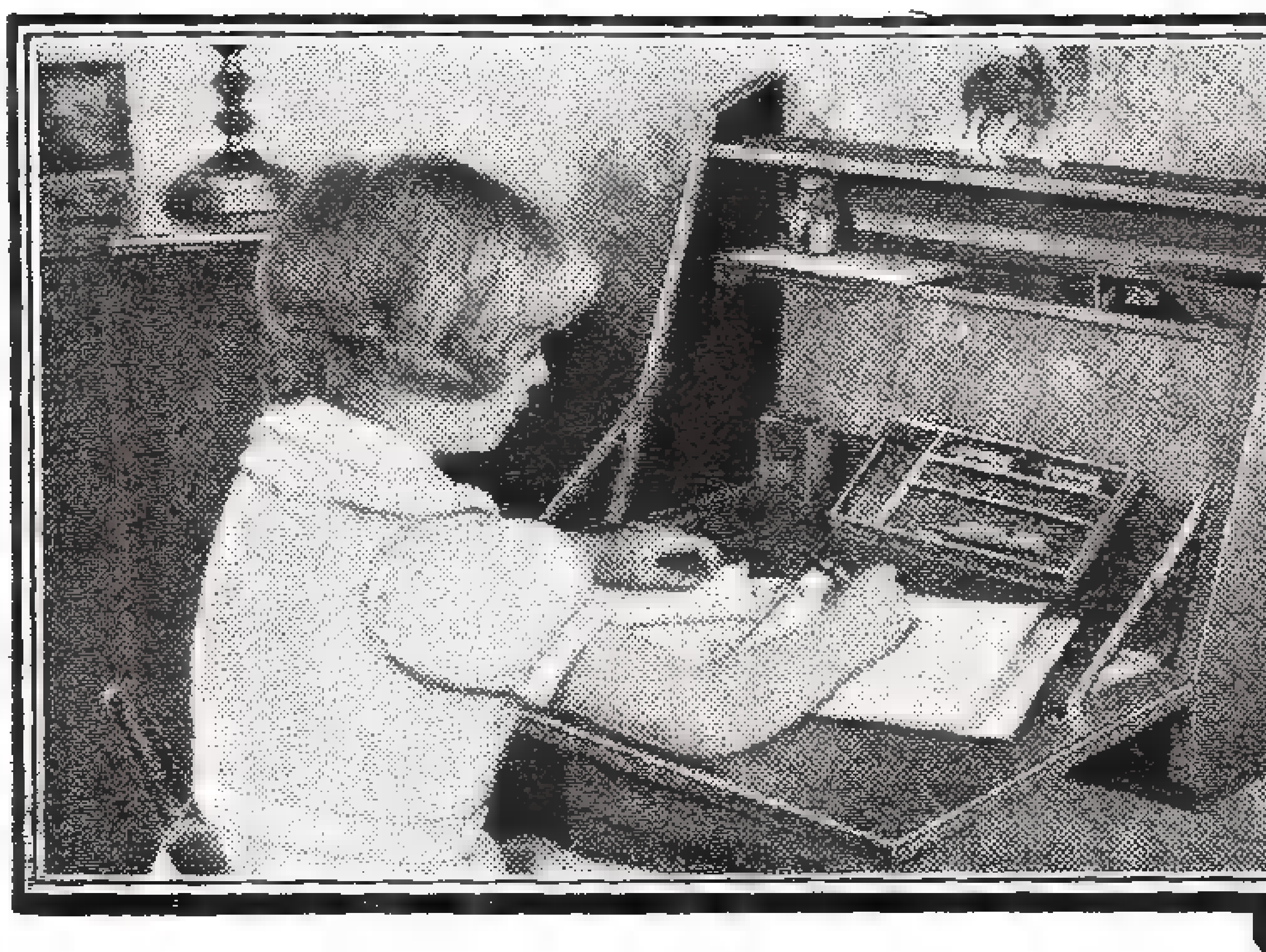

EARS ON OUTER LAMINATION
DRAW DOG BY USING SQUARES
CENTER BODY BLOCK
TAIL BLOCK
LEG BLOCK
OUTER LAMINATION

TOY CART teaches little children to make rounds of house, picking up toys at end of day. Plywood overlays in animal designs are glued to sides of cart, then painted. Wheels are turned from pine or hardwood, then fitted with bushings. Assemble with wood screws.

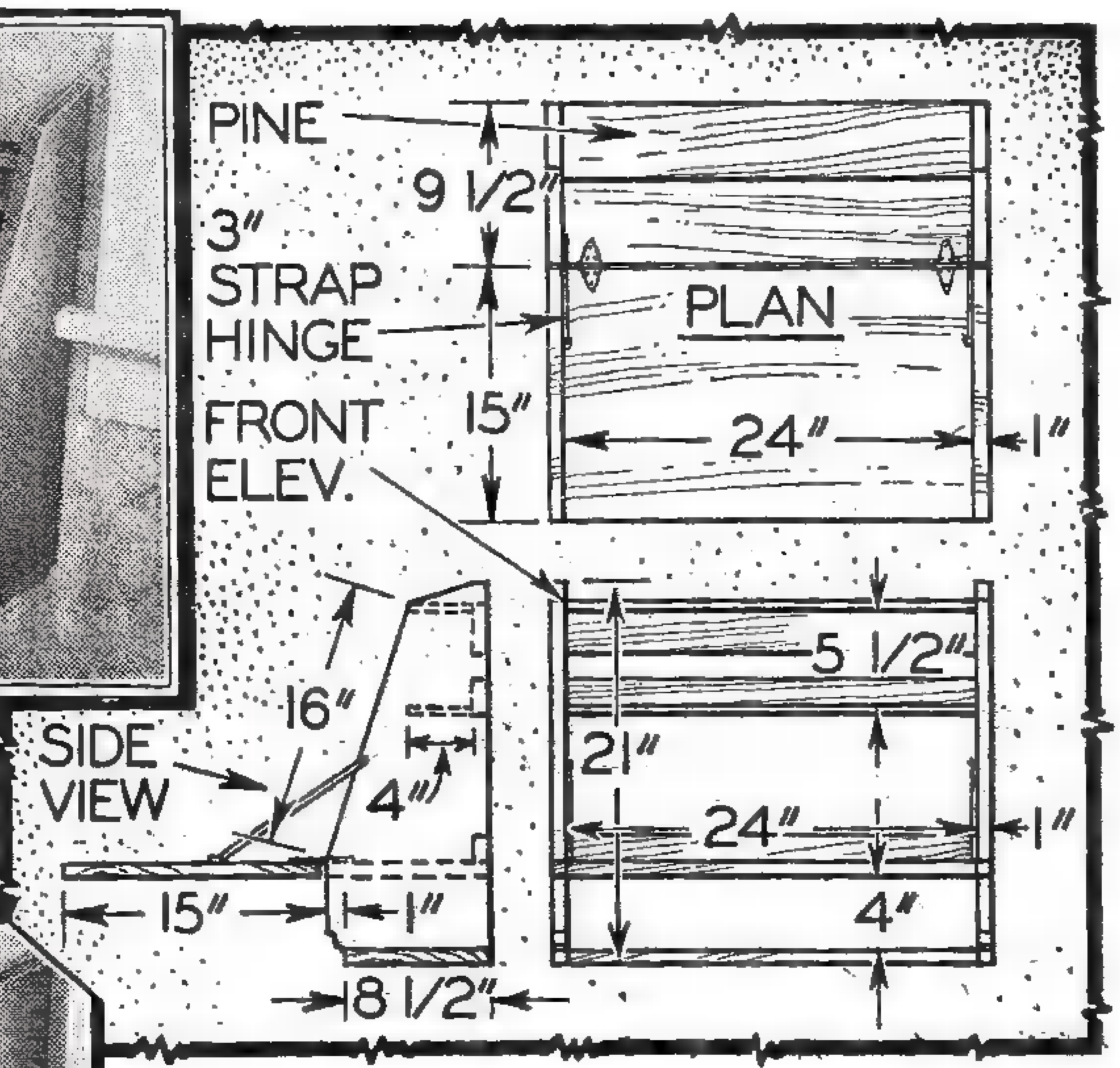

LAY OUT WITH ½" SQUARES PATTERN
PARTIAL END VIEW
PAINT RABBIT, PANEL AND BOX DIFFERENT COLORS
SCREWS
1⅜"
8"
3½"


HAND ROD
11½"
11"
11½"
17"
2"×2"×14½"
ROUND IRON AXLE 18"×⅜"
WHEEL
HUB CAP
BODY BOX
1"
¾"
1⅛"
SIDE VIEW

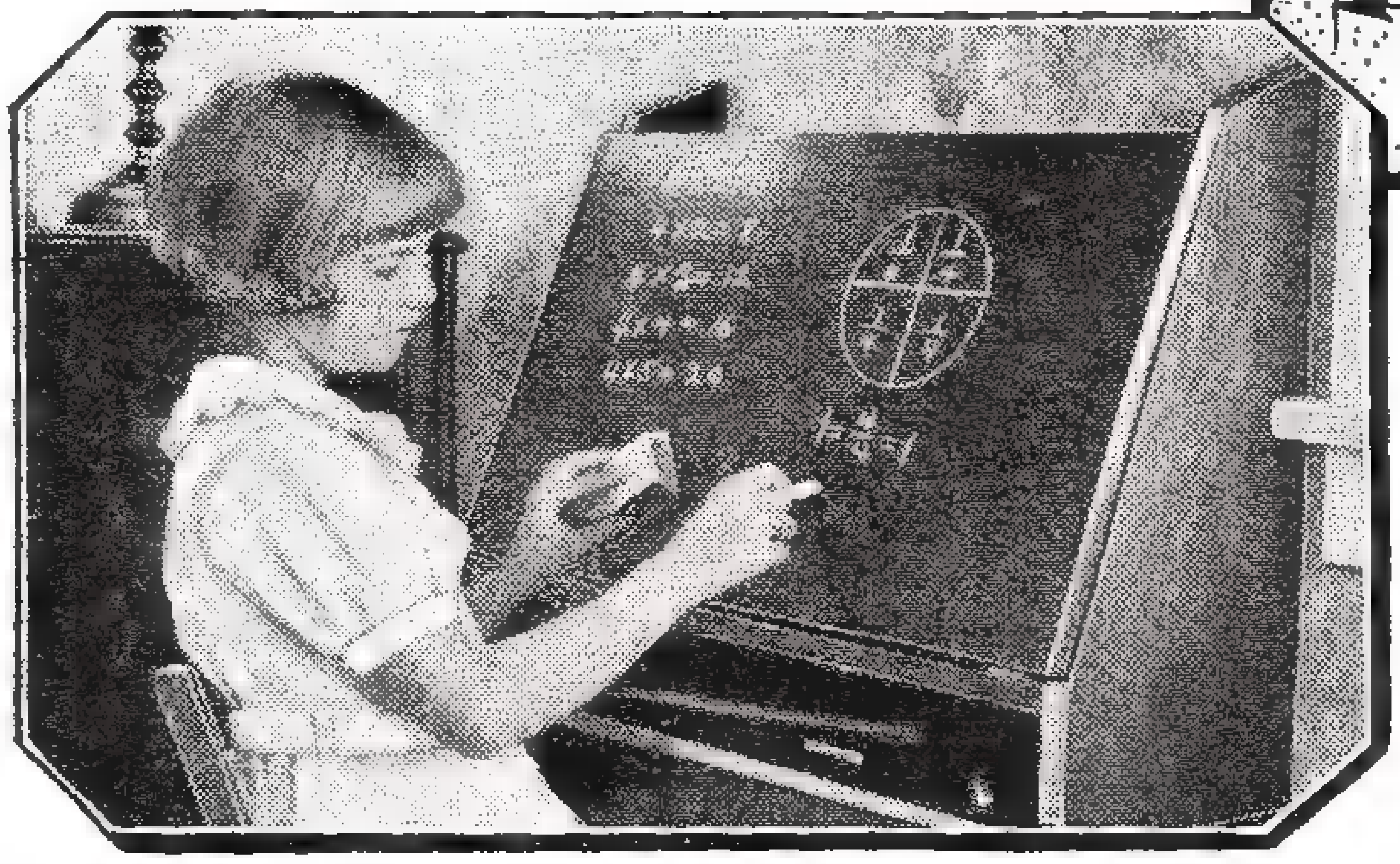
Blackboard Desk Delights School Children



Sliding desk brackets enable blackboard to swing down, forming convenient writing desk. One side may be screwed to window frame, other to wall studding.



Lumber required for combination blackboard desk: One piece 1"x10"—8' long; one piece 1"x16"—2' long; one piece ½"x4"—4' long; six feet of 1"x2" pine to go under each shelf. Use clear white pine.



Small shelf just below the blackboard holds chalk and an eraser. If carefully prepared, blackboard surface will be just as satisfactory as if heavy slate panel were used.

PROPERLY decorated, this sturdy and useful combination desk and blackboard becomes a handsome piece of furniture. Being adjustable in height, children do not outgrow it. It can be hung conveniently on any wall.

Clear, finished pine will do nicely for this desk, and will be very easy to work with. Saw out each part to the dimensions given, slightly round the corners and edges with a plane, and carefully sand every face and edge. Use screws throughout for the assembly, drilling and counter-sinking holes so they may be covered over with wood filler later.

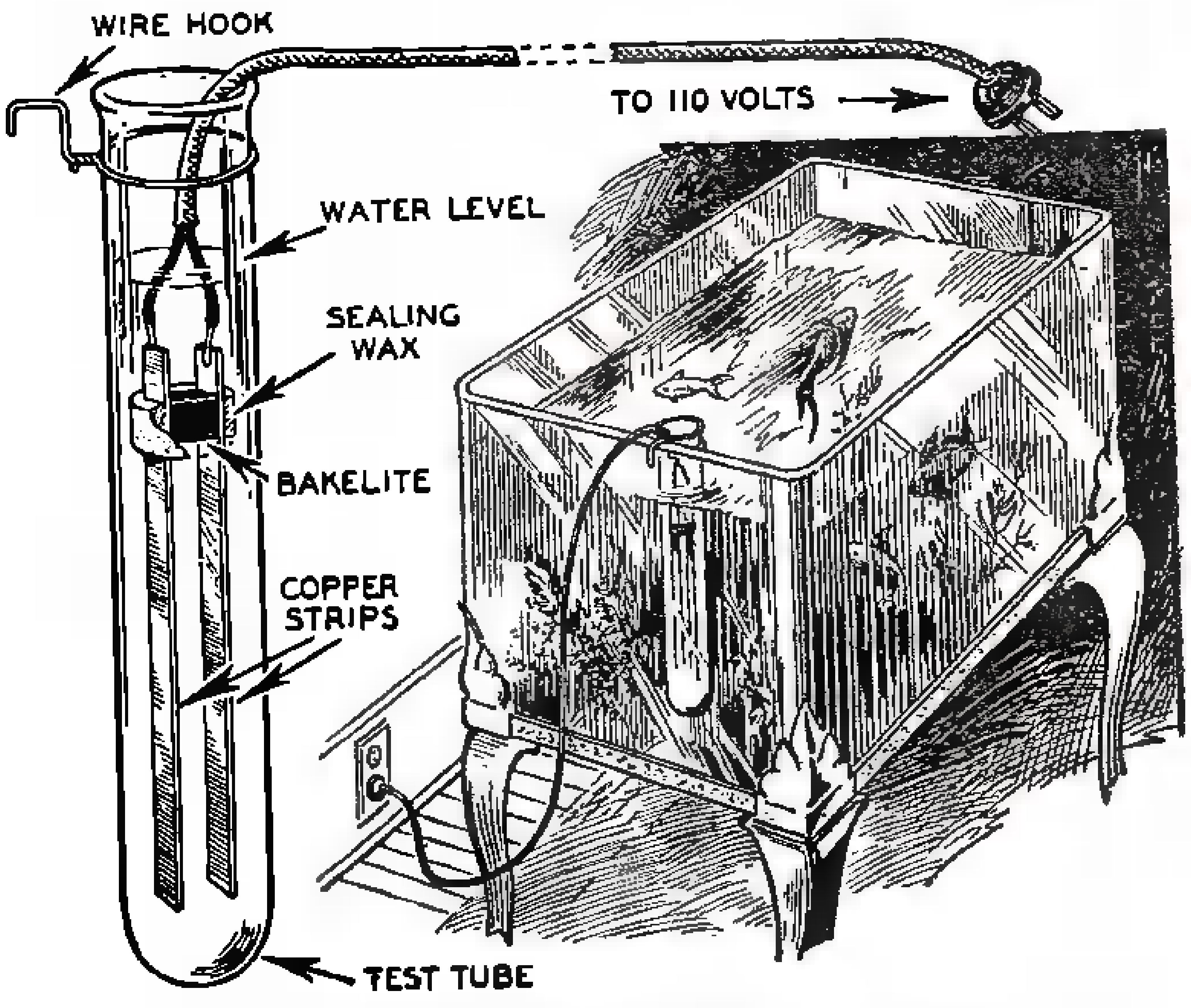
One of the most pleasing of finishes is a dark oak or walnut varnish stain. After this is dry, sandpaper lightly and apply a coat of white or orange shellac. Again sandpaper and finish off with clear varnish. The blackboard is given two coats of flat paint, sandpapering after each, and finally two coats of "Blackboard Slating"—a liquid which can be bought at paint stores.

The desk is fastened to the wall with two long wood screws, after locating the wall-studding by tapping on the plaster. Place large washers over these screw heads.

Test Tube Heater For Aquarium

WHERE tropical fish are kept in a home aquarium, it is often necessary to raise the temperature of the water, especially during winter nights. A heater consisting merely of two strips of copper dipping into a test tube filled with water, and connected to 110 volts a.c., will be found ideal for small aquariums.

By placing the copper strips closer together and by adding a bit of salt to the tap water in the test tube, the heating effect can be increased. Add water occasionally, since it is continually decomposed by the current. The heater acts as its own thermostat, for the heating effect is proportional to the amount of water in the tube.



Construction of aquarium heater is simple. Fasten small insulating block between copper strips at top with sealing wax.

An Overhead Wire System for Toy Trains

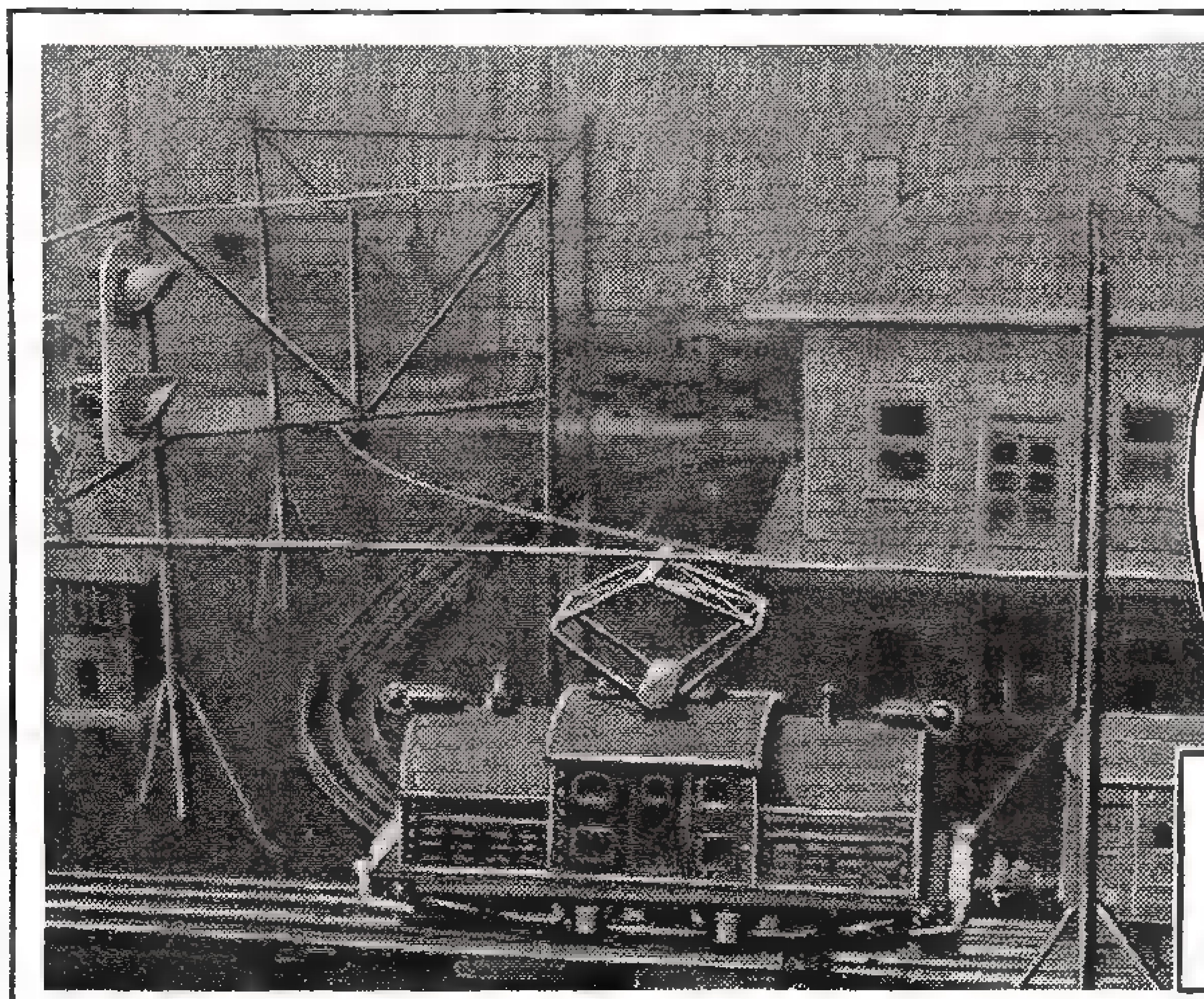
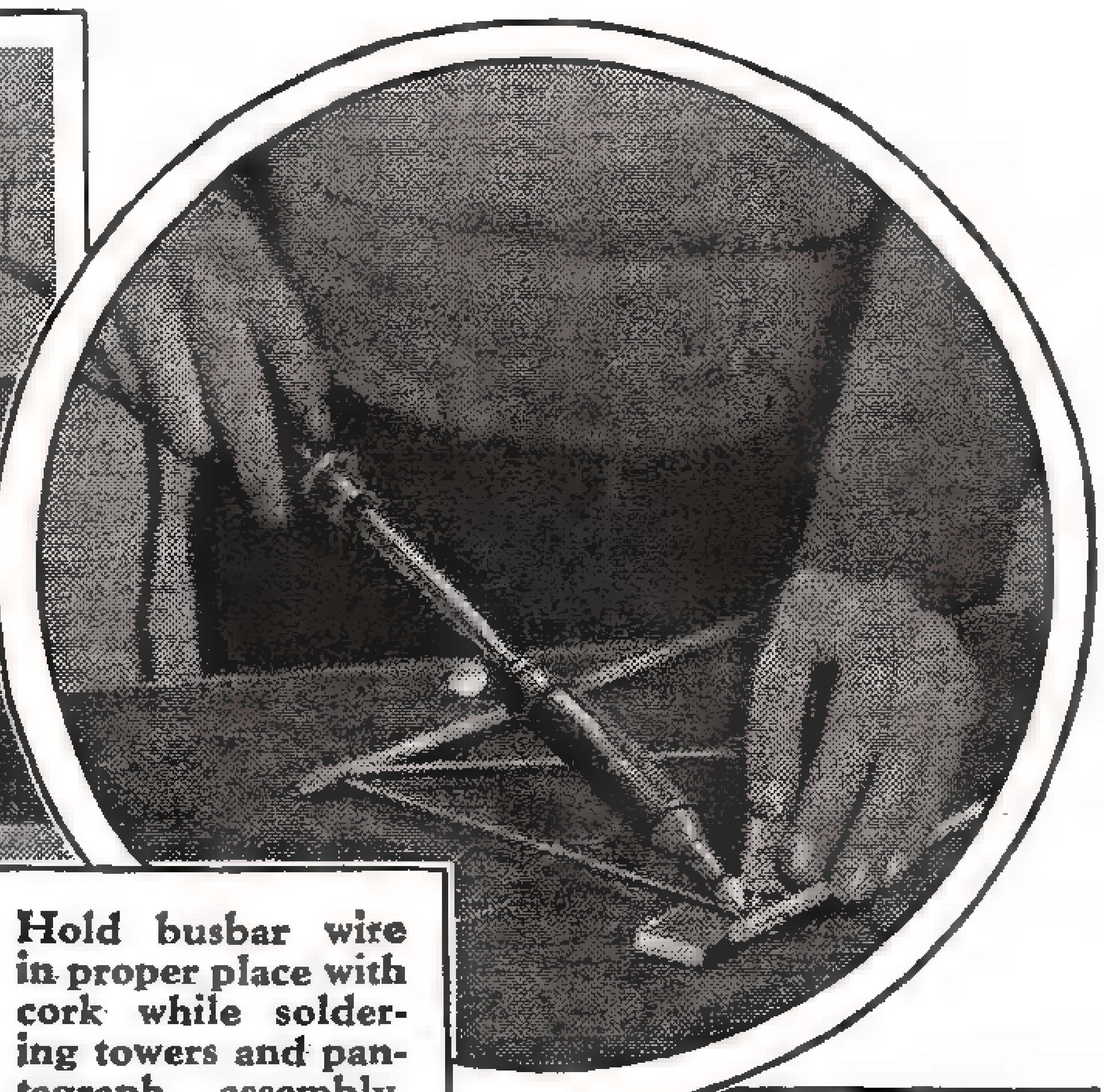
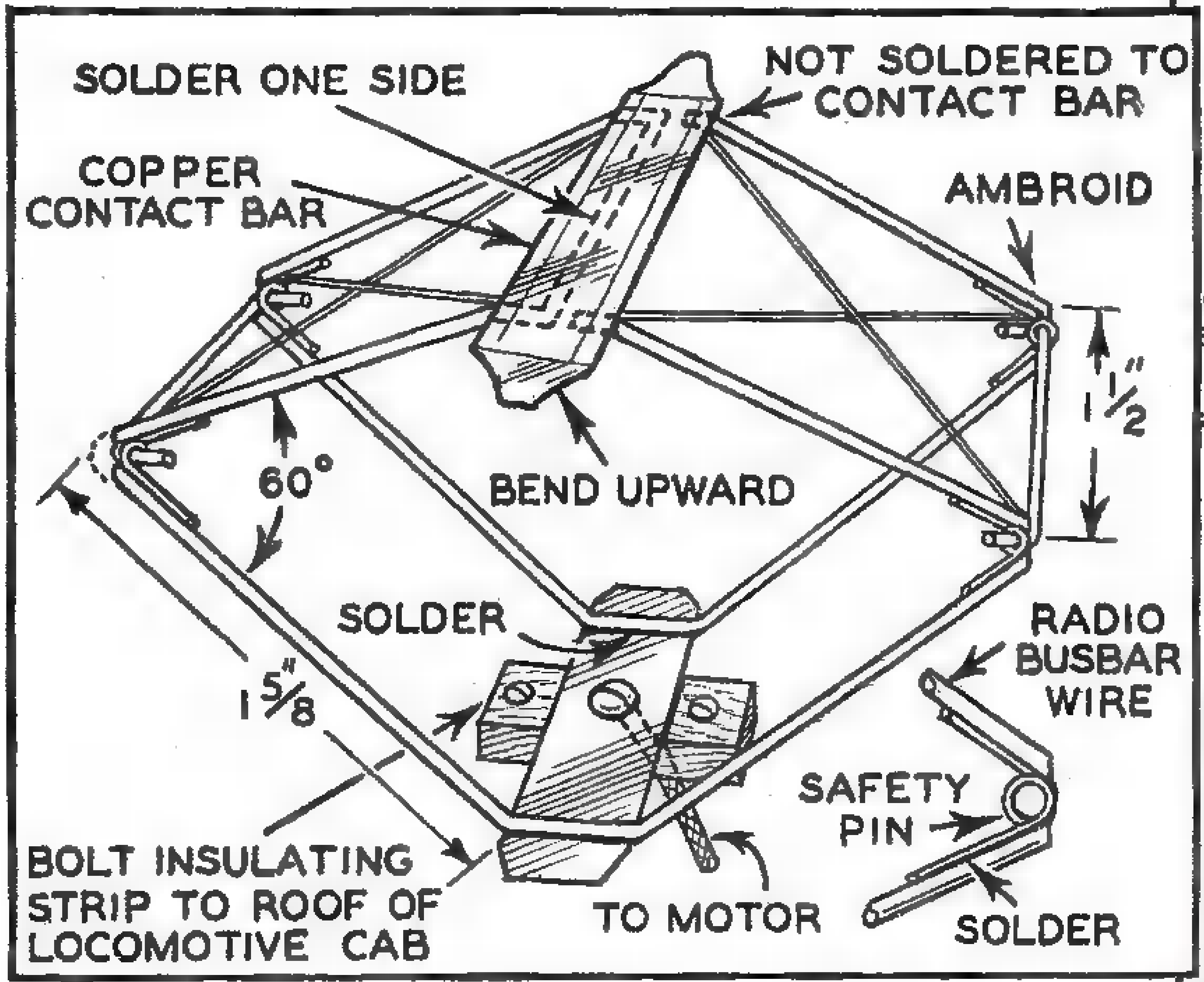


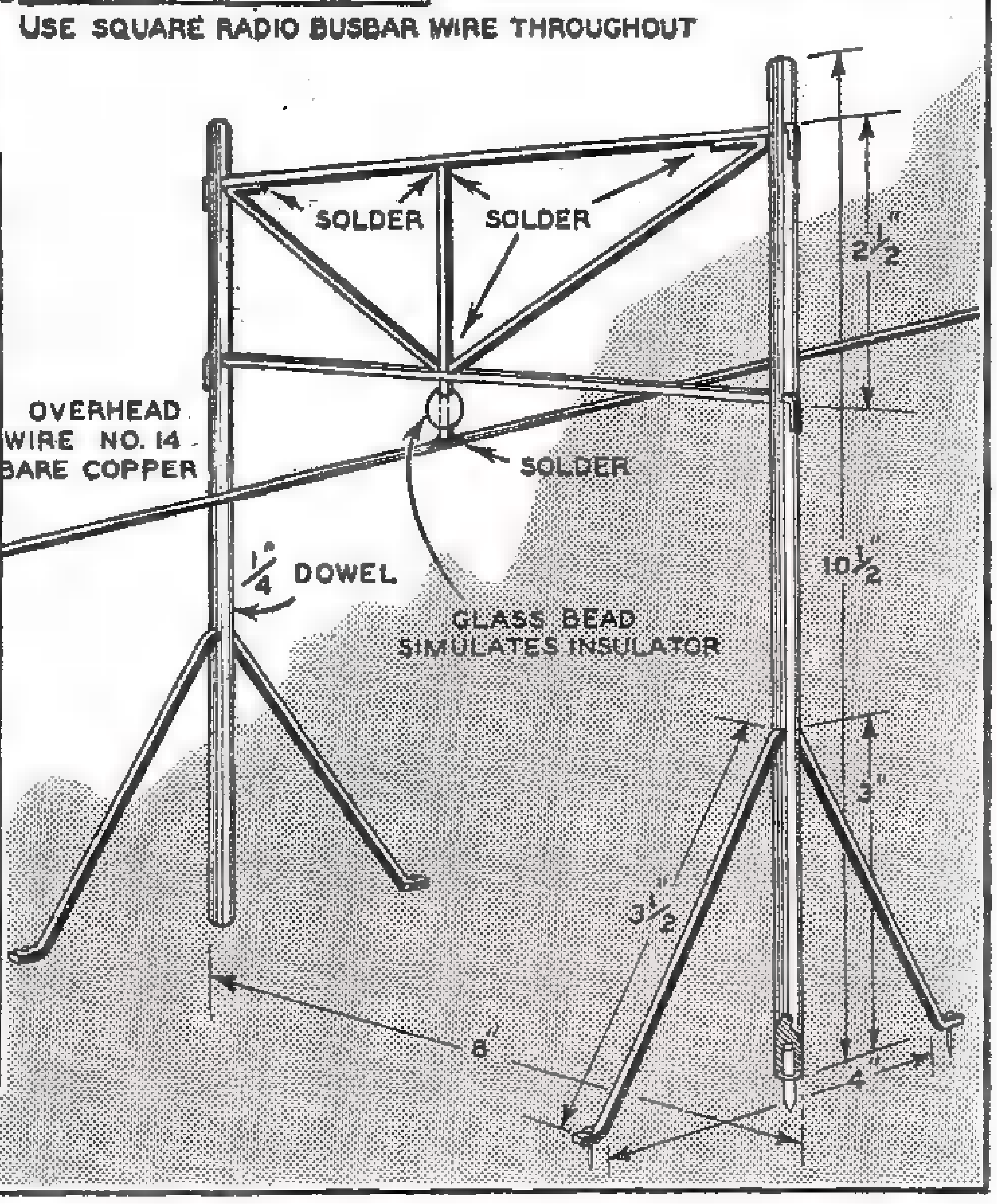
Photo above shows model railroad on which both third rail and overhead wire are used, supplying power to two trains.



Hold busbar wire in proper place with cork while soldering towers and pantagraph assembly.


SOLDER ONE SIDE
NOT SOLDERED TO CONTACT BAR
COPPER CONTACT BAR
AMBROID
1½"
60°
BEND UPWARD
SOLDER
RADIO BUSBAR WIRE
1⅝"
SAFETY PIN
BOLT INSULATING STRIP TO ROOF OF LOCOMOTIVE CAB
TO MOTOR
SOLDER

Make pantagraph with dimensions indicated. Flow solder over top of contact bar. Springs should not be too stiff.


USE SQUARE RADIO BUSBAR WIRE THROUGHOUT
SOLDER
SOLDER
2½"
OVERHEAD WIRE NO. 14 BARE COPPER
SOLDER
¼" DOWEL
GLASS BEAD SIMULATES INSULATOR
10½"
3"
3½"
8"
4"

Construction of wire-supporting towers is made as simple as possible. Finish equipment with "Blackboard Paint" to give weather-beaten appearance. Locate towers by trial on curves.

BY INSTALLING this simple overhead wire system on your model railroad layout, two locomotives can be operated independently of each other on the same block of track—one getting power from the pantagraph and overhead wire, the other from the usual third rail.

Regular schedules of freight and passenger service can be carried out in a realistic fashion on the same line; the blinking red and green eyes of the block signals will take on a new importance, for they will have to be obeyed if accidents are to be prevented.

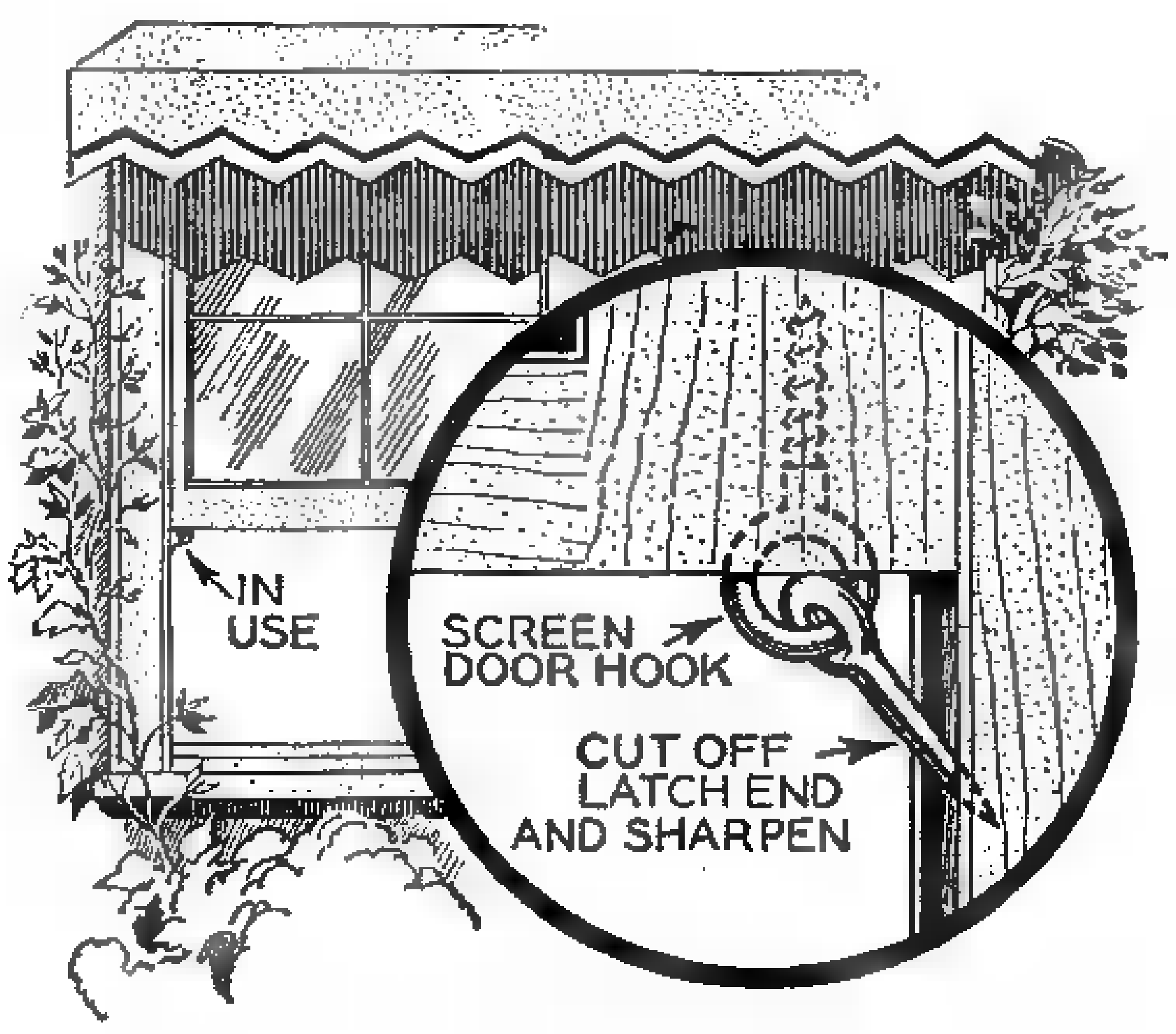
The steadying effect of the pantagraph on turns will permit a decided increase in speed, and give the overhead wire system an advantage even on single train layouts. Here the third rail can be used to supply current for train lights, insuring that they will be on when the train is stopped.

The pantagraph is made up from radio busbar wire, with safety pin springs at the joints. The base and current collector strip are cut from sheet copper and soldered to the assembly. Cross wires which brace the pantagraph assembly can be ambroided or soldered in place.

The assembly is now mounted on a bakelite insulating strip cut from a radio panel, and fastened to the roof of the engine cab. The wire leading from the motor to the third rail contactor is removed and soldered instead to the pantagraph bolt.

One overhead wire supporting tower is needed for each section of curved track and for each two sections of straight track.

ABOUT-THE-HOME HANDIKINKS

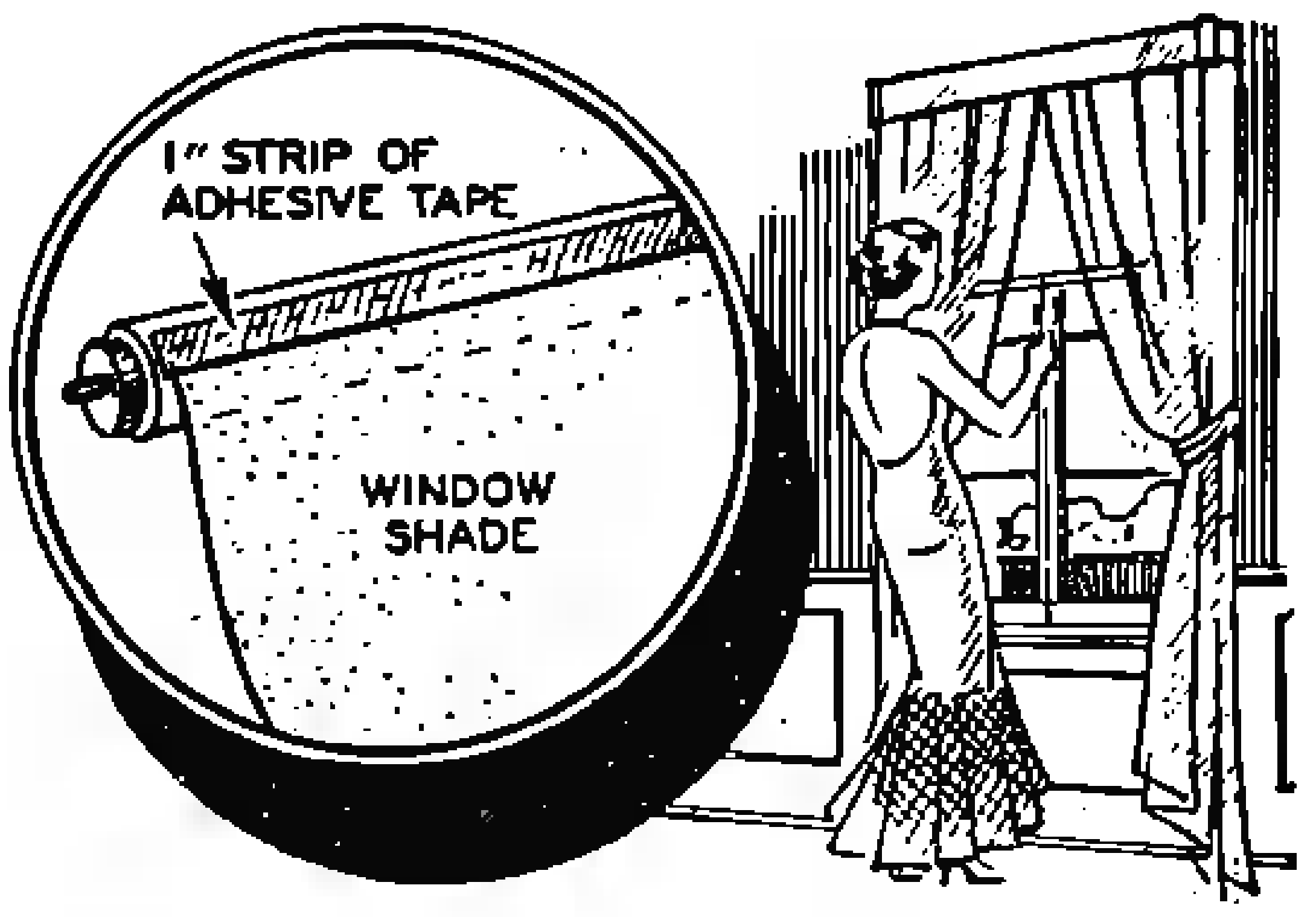

IN USE
SCREEN DOOR HOOK
CUT OFF LATCH END AND SHARPEN

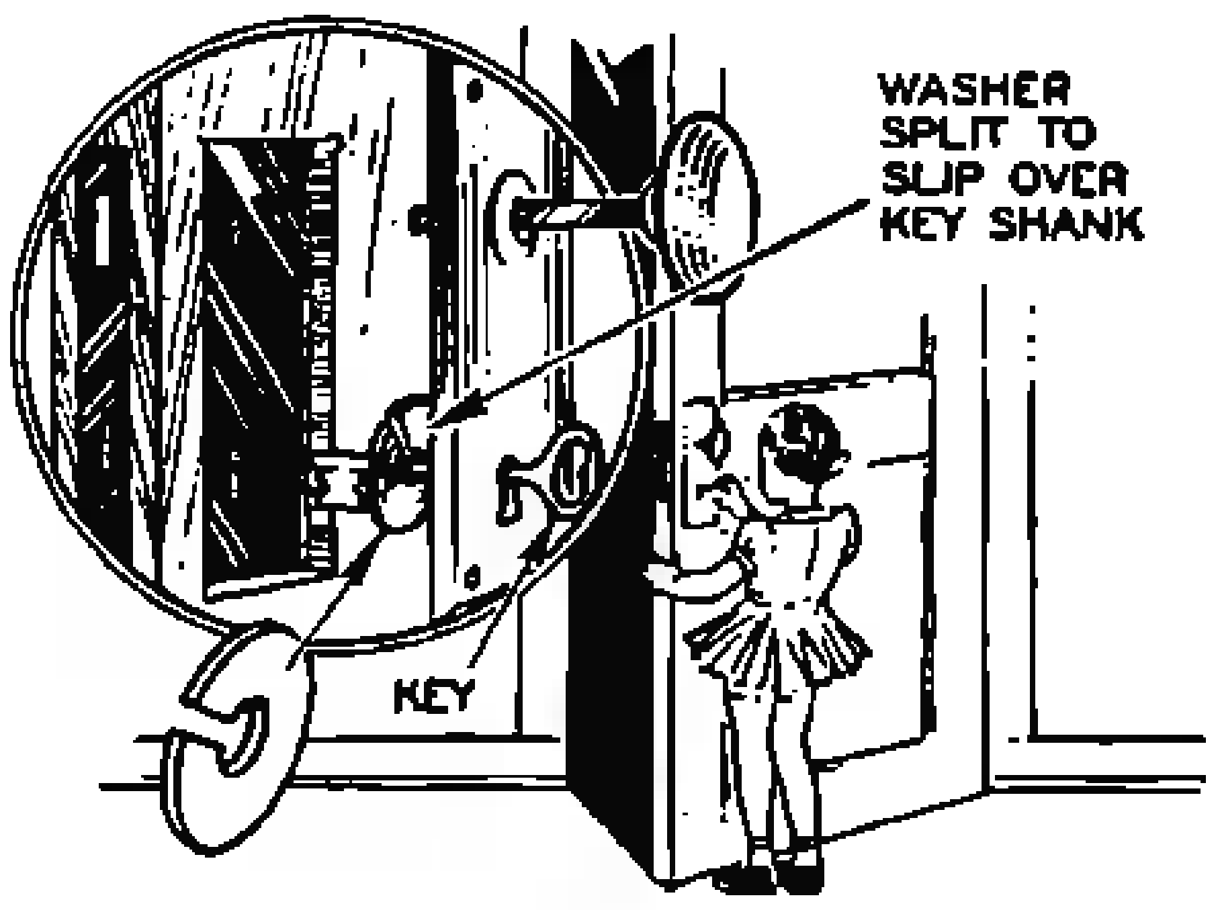
Screen Door Hook Holds Window Sash Up

ON WINDOWS where the sash cord has broken or was never attached, an ordinary screen door hook can be used to hold the sash rigidly at any desired height. The latch of the hook is cut off at the bend, and the end filed to a sharp point. The screw eye is then turned into the bottom of the window and finally set parallel to the glass. After the window is raised to the desired height, the sharpened latch is pushed into the frame enough so it will dig into the wood. On heavy windows it will be best to use one of these latches on each side of the frame.—Ralph Anderson.

Fasten Shade to Roller With Adhesive Tape

A WINDOW shade won't pull off its pole if it is fastened with adhesive tape instead of with tacks. The white waterproof type of tape in either ½" or 1" widths is thinnest yet of adequate strength, and therefore best for this purpose. Shades already tacked down, which are beginning to show signs of tearing from the tacks, can also be reinforced with tape.—Frank S. Hajicek.



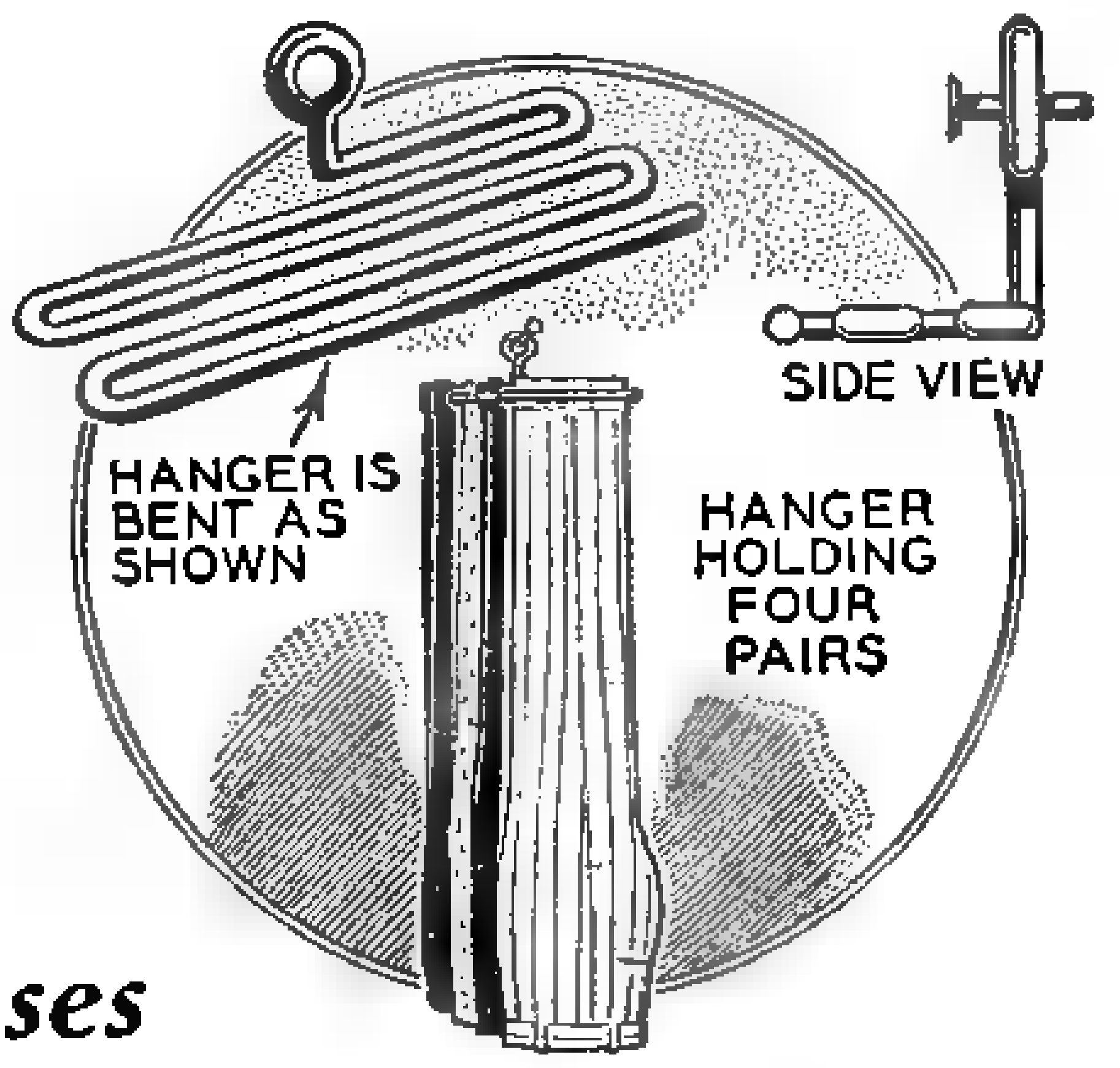

WASHER SPLIT TO SLIP OVER KEY SHANK
KEY

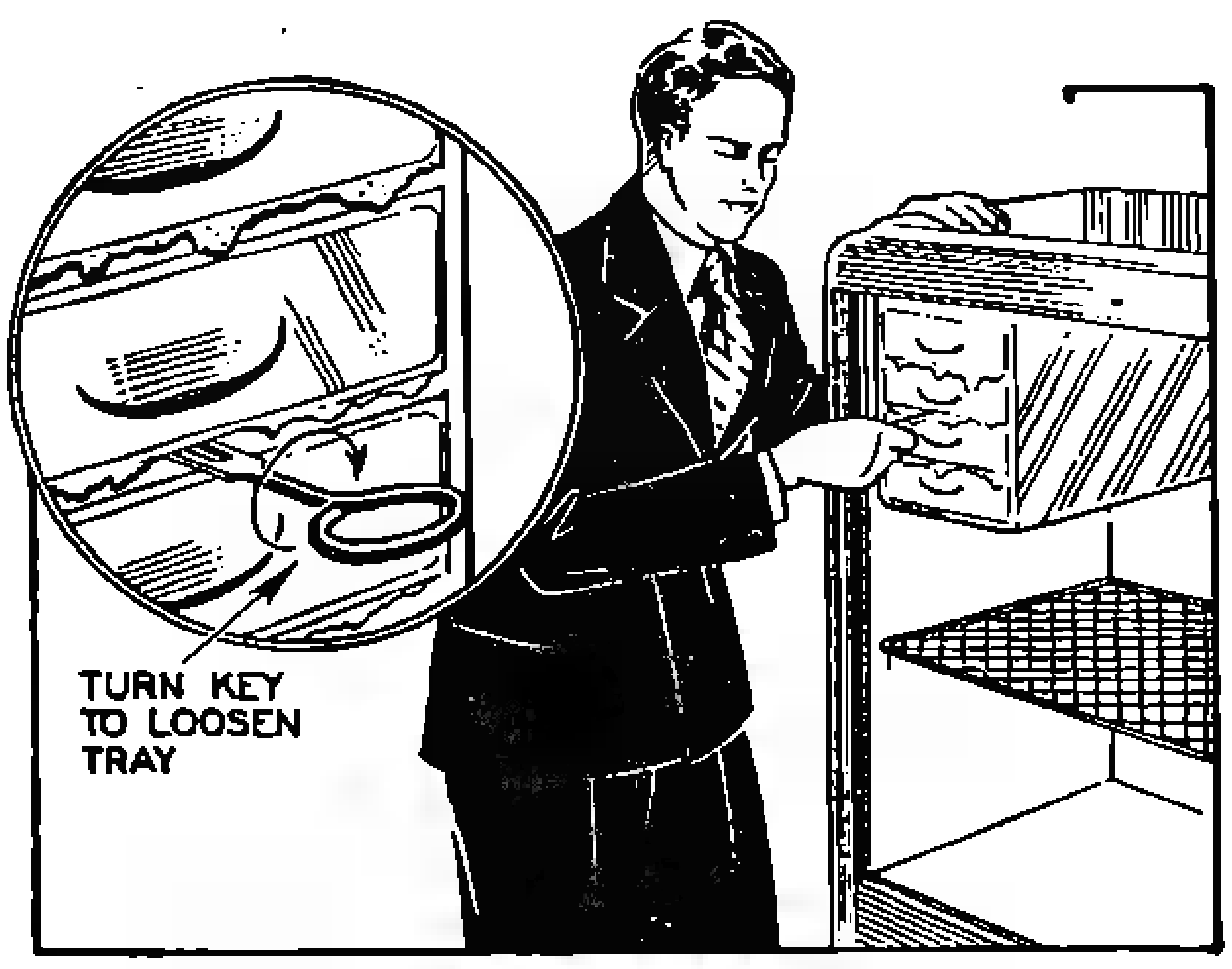
Fasten Key in Door Lock

DOOR keys will not be lost by children if they are fastened permanently inside the lock. To do this, remove the door knob and the escutcheon plate. Now pass the door key through the key-hole in the plate and slip over its shank a split washer. Replace the plate and knob. This kink can be used only on closet and basement doors which are always locked from the same side.—Emil J. Novak.

Home-made Hanger Holds Four Pair of Trousers

THOUGH readily made from a single piece of quarter-inch metal rod, this trouser hanger will hold four pair of pants, each of which may be removed without disturbing the others. Bend an eye in one end of the wire, and make folds back and forth in a grid network as shown at the right. These folds are spaced just far enough apart so they will slip under the cuffs of the pants.—A. T. Williamson.



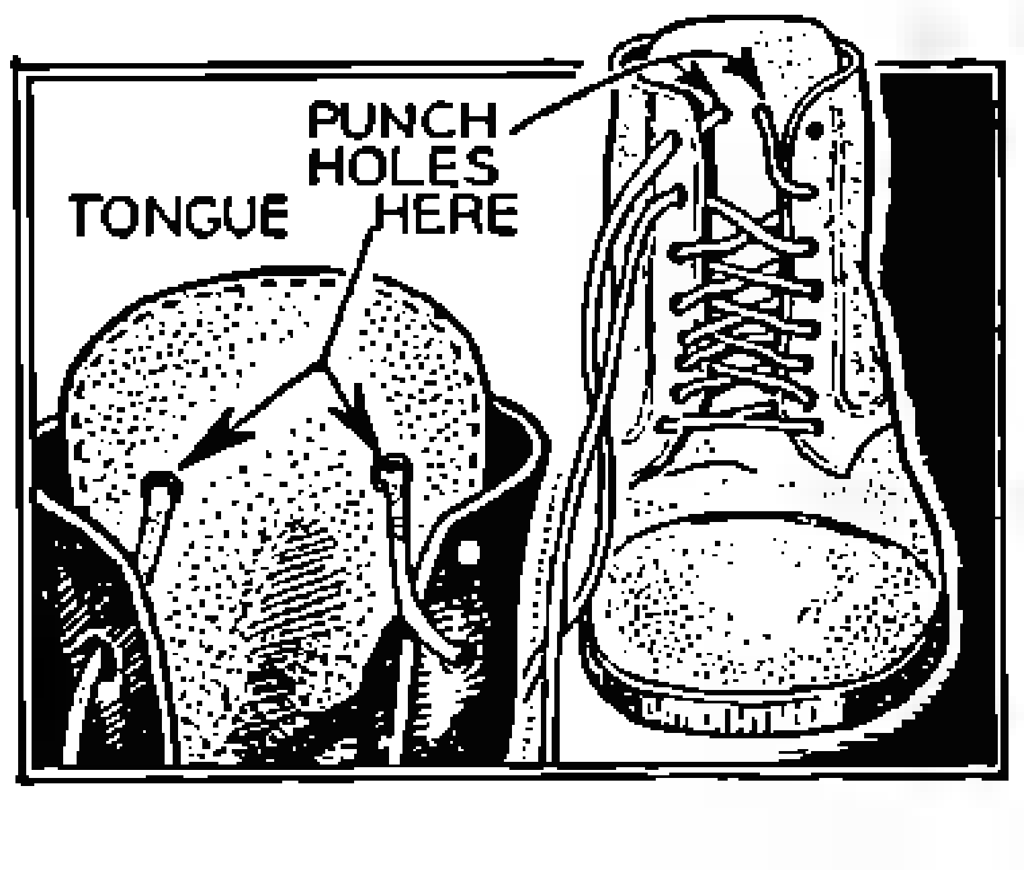

TURN KEY TO LOOSEN TRAY

Can-opening Keys Make Ice Tray Releases

THOSE who have owned the older types of electric refrigerators know what trouble a frozen ice tray can make before it will come out. A thin film of ice collecting at the bottom of the tray is the cause of this trouble. The trays are easily loosened, however, if one of the opening keys coming with sardine cans is slipped under each when the water is put in. Twisting the key loosens the tray at once. If keys are round, flatten with hammer.—C. F. Hall.

Stop Shoe Tongue Slip

SOFT leather tongues in the high shoes often worn by children have an annoying tendency to slip to one side. The remedy is simple, and takes only a minute. Punch two small holes near the top of each tongue, locating them so they will come in line with the top eyelets. Thread one of the laces through these two holes before bringing it through the top eyelet, and the tongue will always stay in position.—John G. Fleming.



Novel Kitchen Desk Has PHONE *Niche*

Finished in glistening aluminum bronze, jet black, and white enamel, this practical corner desk and phone stand will add a modernistic touch to your kitchen.

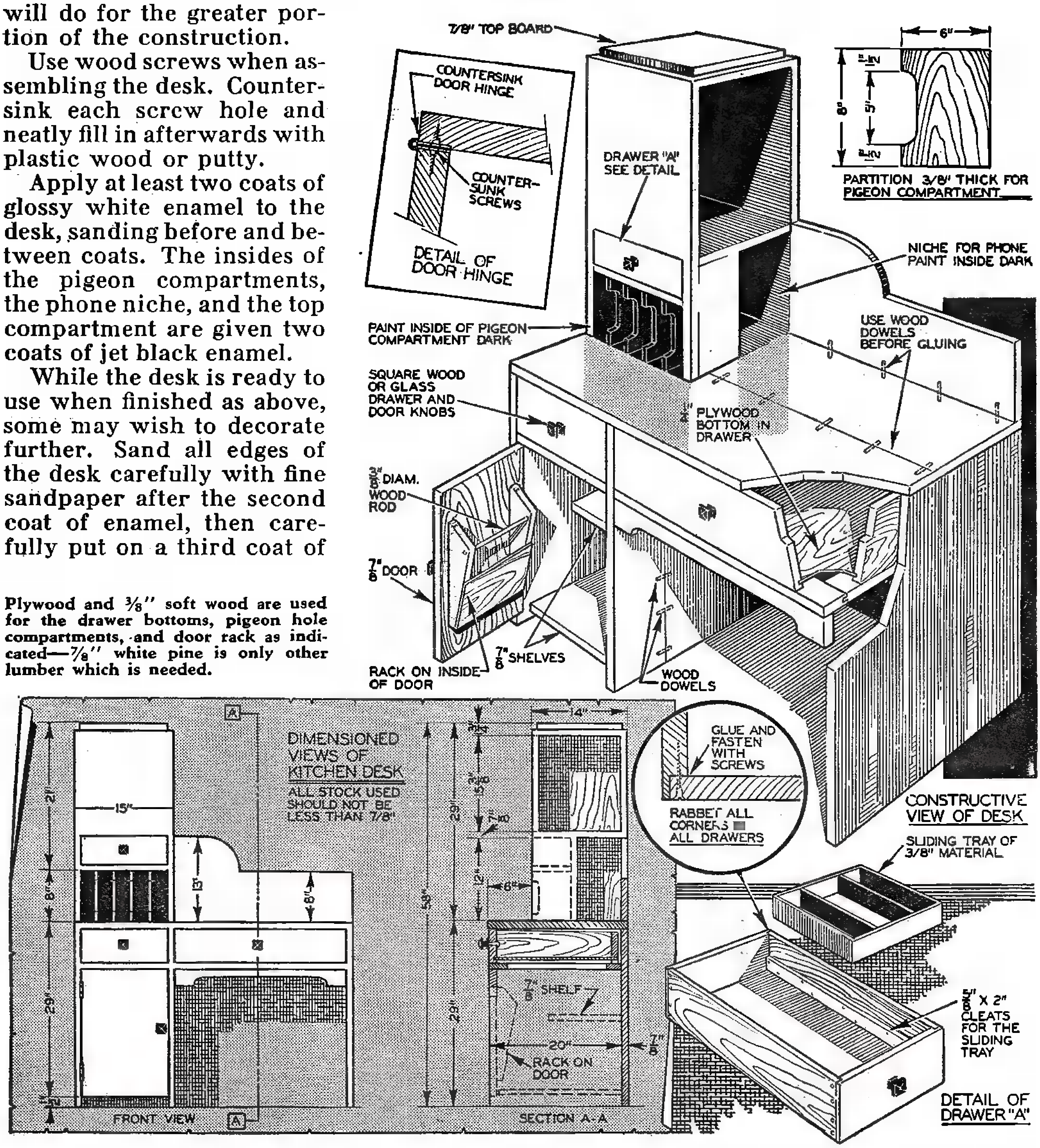
ANY housewife will be proud to have this combination kitchen desk and telephone stand in her kitchen. With cookbooks, recipe cards, napkins, wax paper, pencils and pens all in their proper places in the desk, a great deal of the fuss and bother of cooking will be forgotten.

The charm of this desk lies in the finish rather than in the woods used, making the cost surprisingly low. White pine lumber will do for the greater portion of the construction.

Use wood screws when assembling the desk. Countersink each screw hole and neatly fill in afterwards with plastic wood or putty.

Apply at least two coats of glossy white enamel to the desk, sanding before and between coats. The insides of the pigeon compartments, the phone niche, and the top compartment are given two coats of jet black enamel.

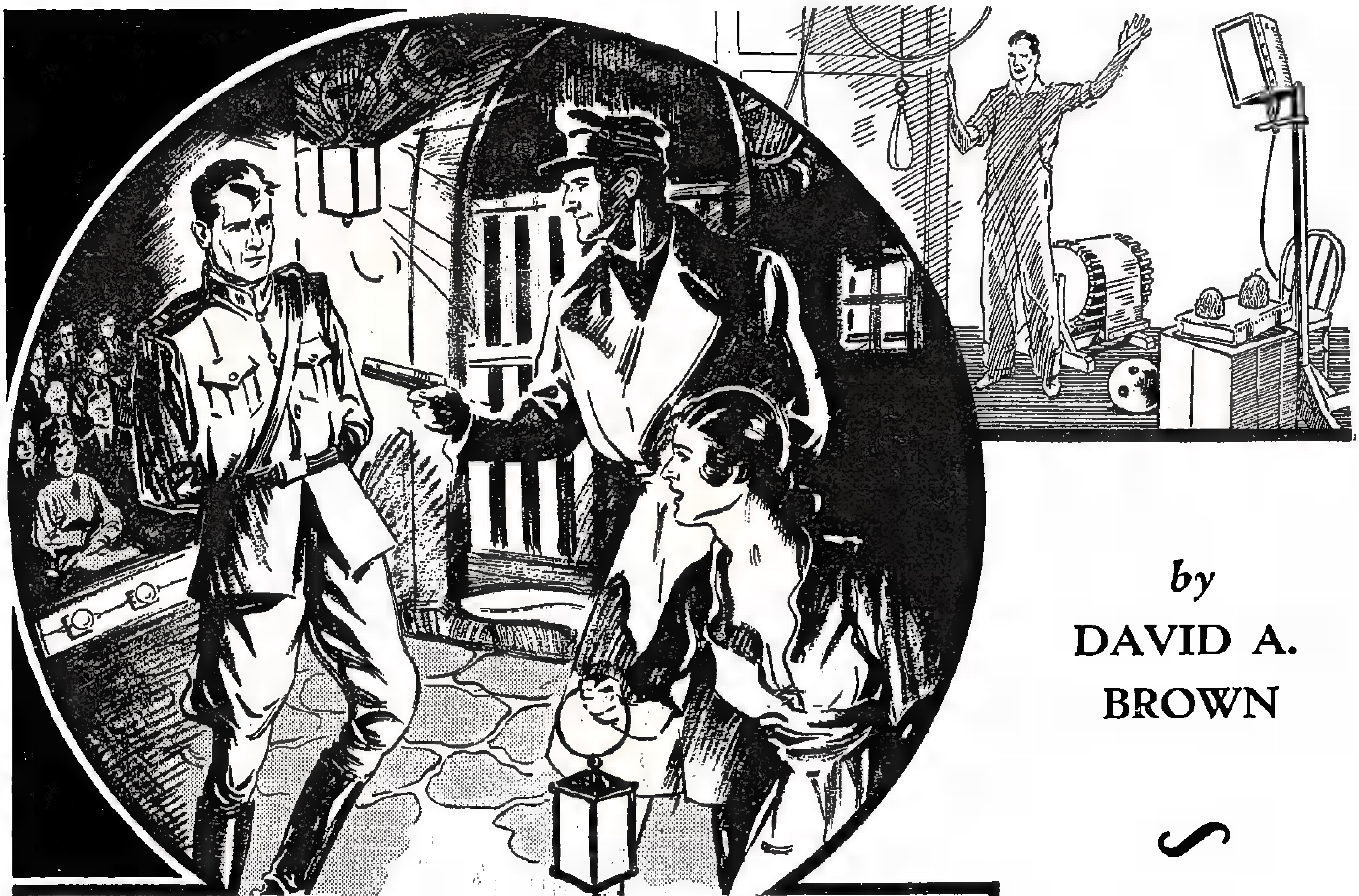
While the desk is ready to use when finished as above, some may wish to decorate further. Sand all edges of the desk carefully with fine sandpaper after the second coat of enamel, then carefully put on a third coat of white enamel over those edges on which you wish to have a brilliant metallic silver finish. Wait until this coat is almost dry, or just barely past the "tacky" stage. Now take a pad made of cotton flannel and dust and rub into the sticky enamel a coating of Fine Lining Aluminum Bronze, a finer grade of ordinary aluminum bronze. You will be surprised and pleased at the splendid results.


7/8" TOP BOARD
COUNTERSINK DOOR HINGE
COUNTER-SUNK SCREWS
DETAIL OF DOOR HINGE
6"
8"
5"
PARTITION 3/8" THICK FOR PIGEON COMPARTMENT
DRAWER "A" SEE DETAIL
NICHE FOR PHONE PAINT INSIDE DARK
PAINT INSIDE OF PIGEON COMPARTMENT DARK
USE WOOD DOWELS BEFORE GLUING
SQUARE WOOD OR GLASS DRAWER AND DOOR KNOBS
PLYWOOD BOTTOM IN DRAWER
3/8" DIAM. WOOD ROD
7/8" DOOR
7/8" SHELVES
RACK ON INSIDE OF DOOR
WOOD DOWELS
GLUE AND FASTEN WITH SCREWS
RABBET ALL CORNERS ALL DRAWERS
CONSTRUCTIVE VIEW OF DESK
SLIDING TRAY OF 3/8" MATERIAL
5/8" X 2" CLEATS FOR THE SLIDING TRAY
DETAIL OF DRAWER "A"
DIMENSIONED VIEWS OF KITCHEN DESK
ALL STOCK USED SHOULD NOT BE LESS THAN 7/8"
A
21"
15"
8"
13"
8"
29"
FRONT VIEW
14"
29"
15 3/8"
7/8"
12"
6"
58"
29"
7/8" SHELF
20"
7/8"
RACK ON DOOR
SECTION A-A

Plywood and ⅜'' soft wood are used for the drawer bottoms, pigeon hole compartments, and door rack as indicated—⅞'' white pine is only other lumber which is needed.

Carefully join boards making up sides and top of desk, to make them appear as one piece of lumber. Use wood dowels before gluing boards together. Plane and sand to a smooth finish after glue has dried. Use best boards for desk top.

SOUND EFFECT *Gadgets*



by
DAVID A. BROWN

Bizarre though they may seem, the devices described in this article with a little practice can be made to produce any off-stage sound effect for amateur theatricals.

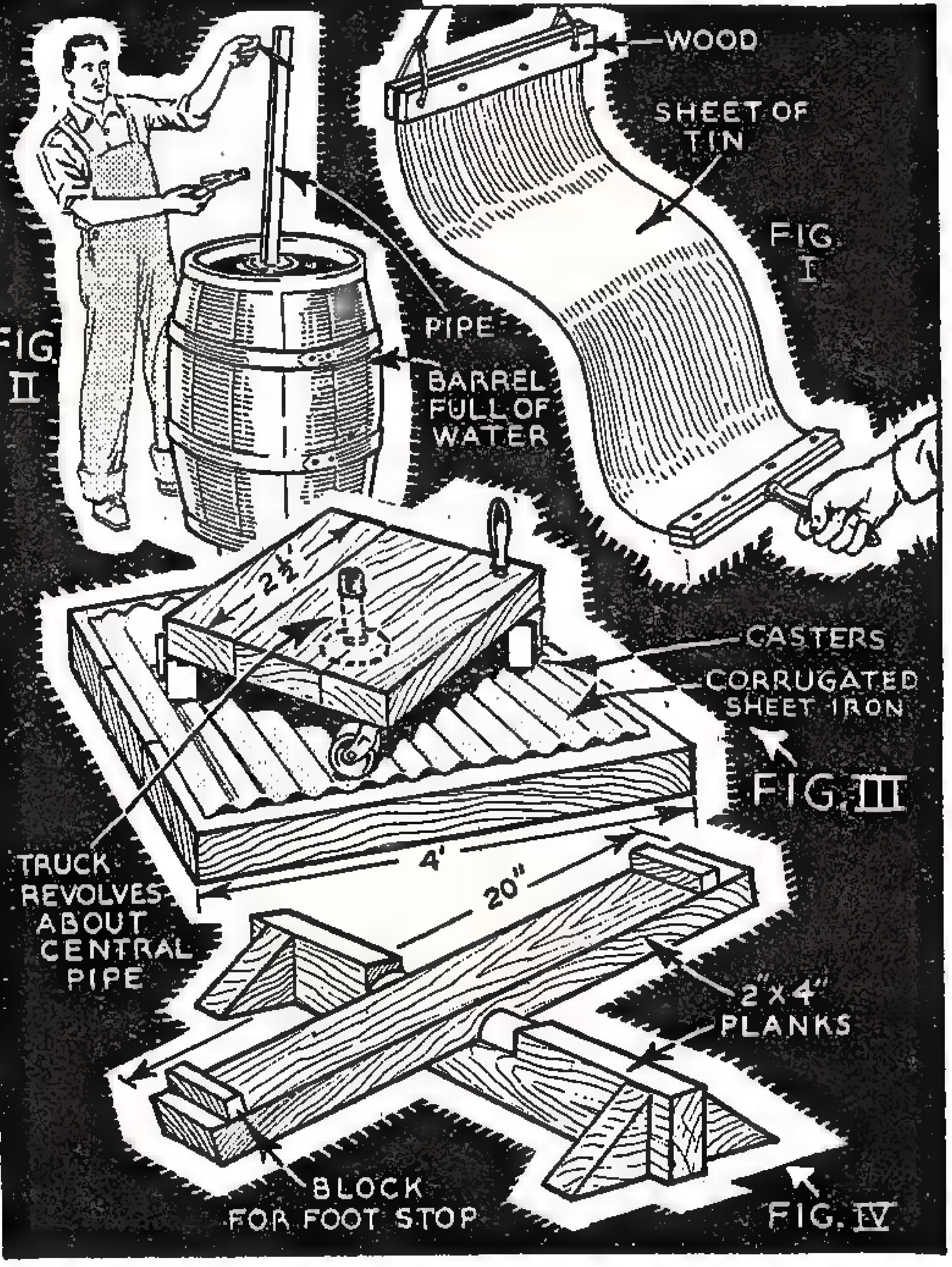
THIS equipment which to the layman may appear to be the invention of a lunatic is used regularly on the professional stage to obtain unusual sound effects. Continued use, however, has demonstrated how these weird devices can add realism to the average stage play.

Little theater groups should have these easily-made noisemakers among their stage equipment, for there is hardly a play written which does not call for the use of some of them.

The thunder sheet, Fig. 1, is shaken to produce the deep roll of thunder. It is made from a sheet of flexible copper or tin, both ends of which are held firmly with light wooden battens. One end is suspended overhead by ropes. A handle of wood or loop of rope makes it easier to operate.

For a loud clap of thunder, fire a blank shotgun shell into an empty barrel, or suspend a log chain by means of rope and pulley over an empty barrel across which is laid a sheet of galvanized iron. At the "cue" release the rope. The sound is deafening.

Pictured below are devices used for producing back-stage thunder, chimes or fire bells, clicking of train wheels passing over rails, or sound of marching men.


WOOD
SHEET OF TIN
FIG. I
PIPE
BARREL FULL OF WATER
FIG. II
2½'
CASTERS
CORRUGATED SHEET IRON
FIG. III
TRUCK REVOLVES ABOUT CENTRAL PIPE
4'
20"
2"x4" PLANKS
BLOCK FOR FOOT STOP
FIG. IV

for the "Little THEATER"

To make a set of chimes, suspend a brass pipe in a barrel of water. Raise and lower the pipe while tapping it with a hammer until the desired pitch is sounded. The water line is the point at which the pipe should be sawed. In this way several pipes may be suspended from a rack by rope, and tuned to form chimes, church, train or fire department bells. For loud ringing use a hammer, for softer tones a striker padded and covered with chamois.

For the sound of train wheels passing over rails use a truck, Fig. 3, mounted on steel casters, revolving on a base covered with corrugated iron roofing. The truck is 2½′ square, the base 4′ square. Cut a hole in the center of the roofing and screw a floor flange pipe socket to the base. Into this screw a section of pipe for the truck to revolve around. Merely cut a hole in the truck to fit the pipe and fasten a convenient handle at one corner for operating the truck.

As a train approaches, first sound a wooden train whistle and ring the bells. Come in with the steam exhaust by lightly

(Continued on page 132)

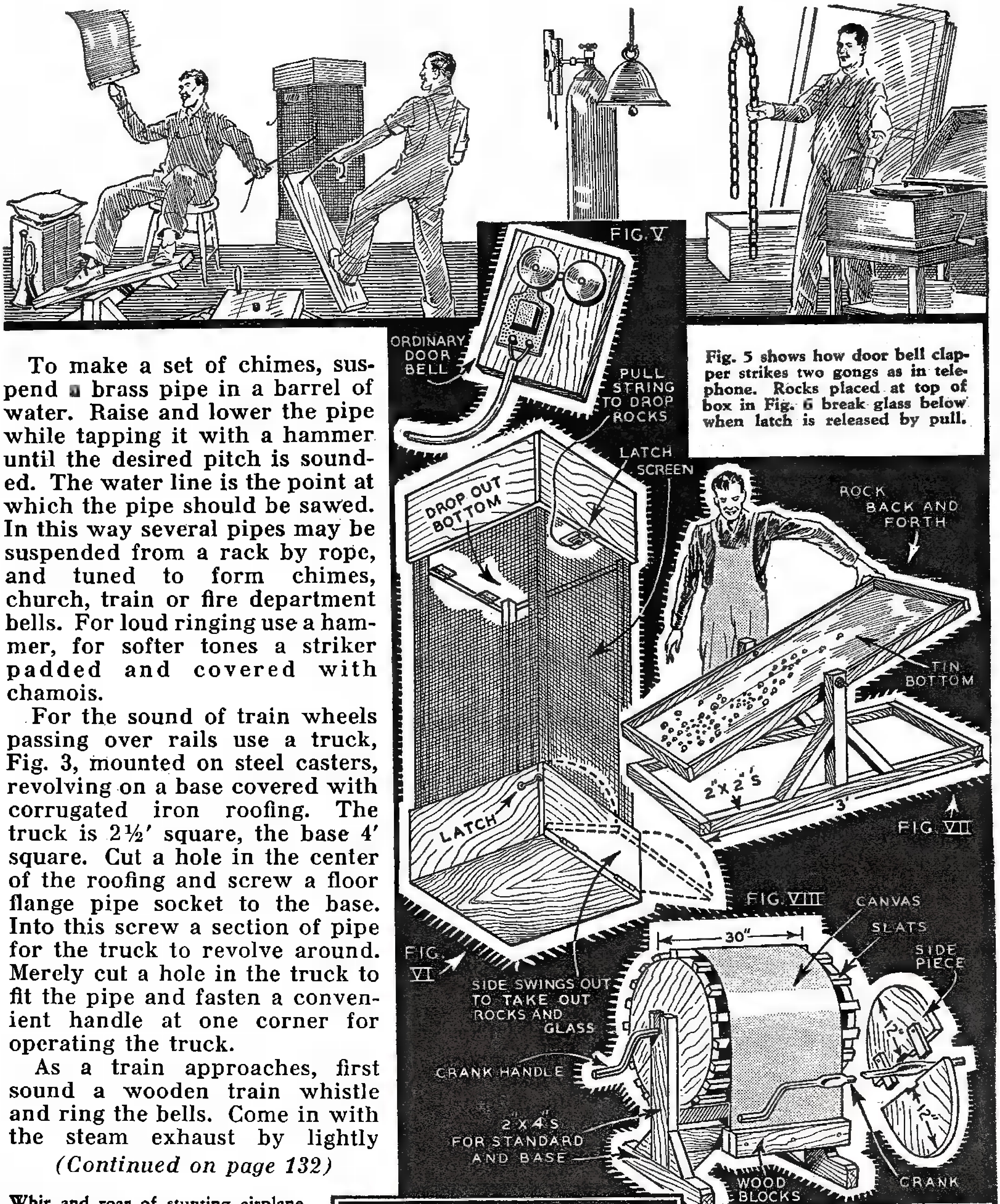
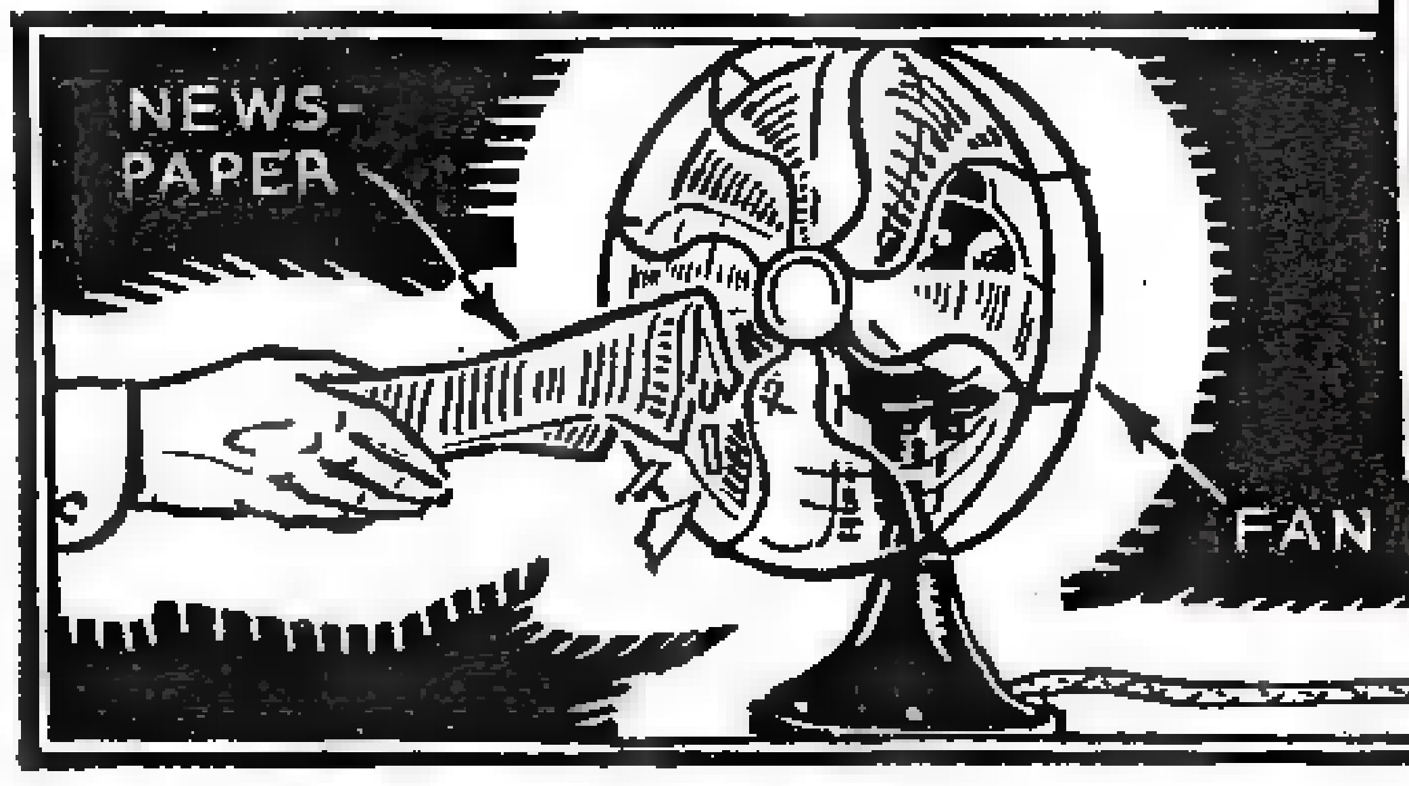
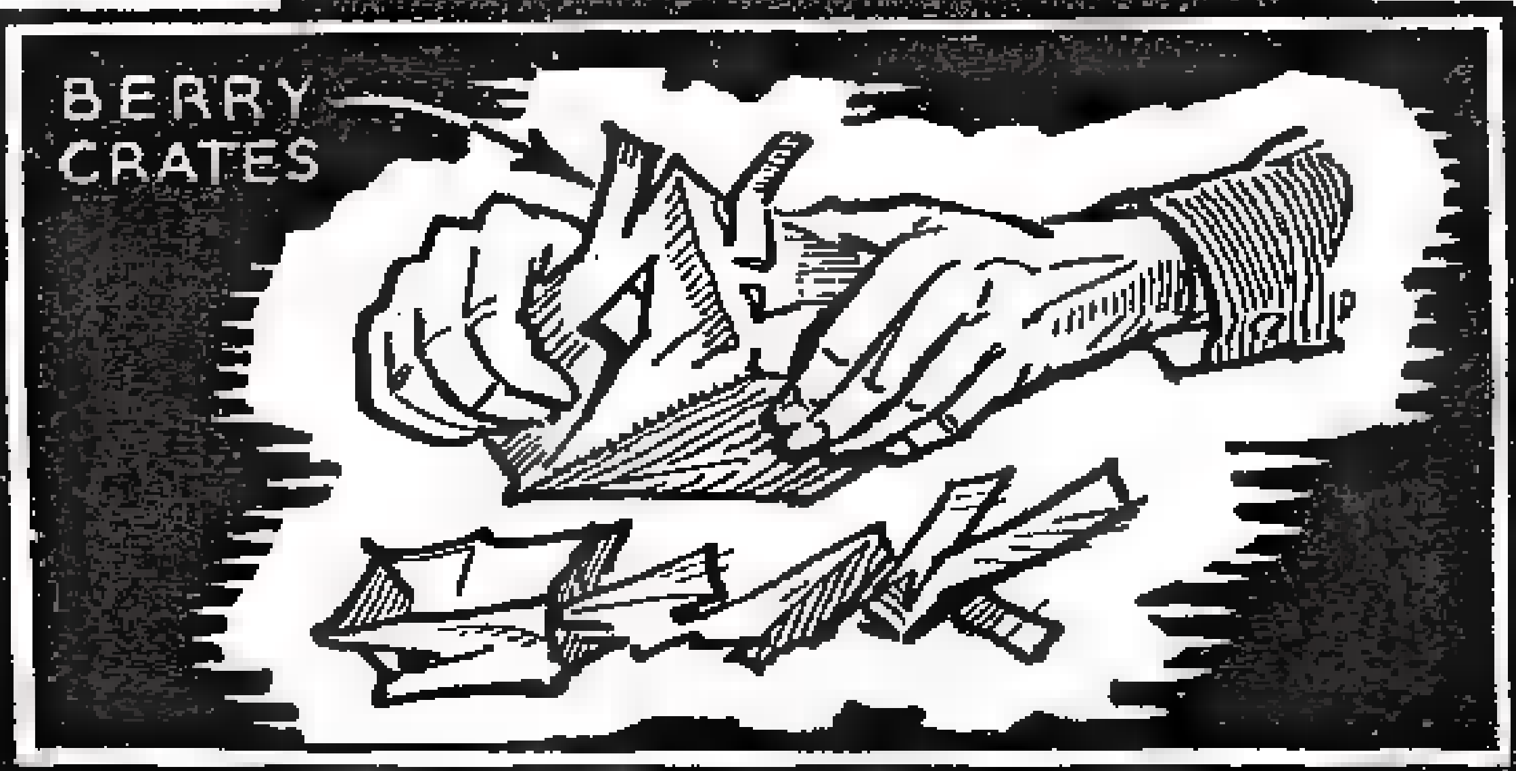


FIG. V
ORDINARY DOOR BELL
PULL STRING TO DROP ROCKS
LATCH
SCREEN
DROP OUT BOTTOM
LATCH
FIG. VI
SIDE SWINGS OUT TO TAKE OUT ROCKS AND GLASS
ROCK BACK AND FORTH
TIN BOTTOM
2"x2"S
3'
FIG. VII
FIG. VIII
30"
CANVAS
SLATS
SIDE PIECE
12"
12"
CRANK HANDLE
2"x4"S FOR STANDARD AND BASE
WOOD BLOCKS
CRANK

Fig. 5 shows how door bell clapper strikes two gongs as in telephone. Rocks placed at top of box in Fig. 6 break glass below when latch is released by pull.

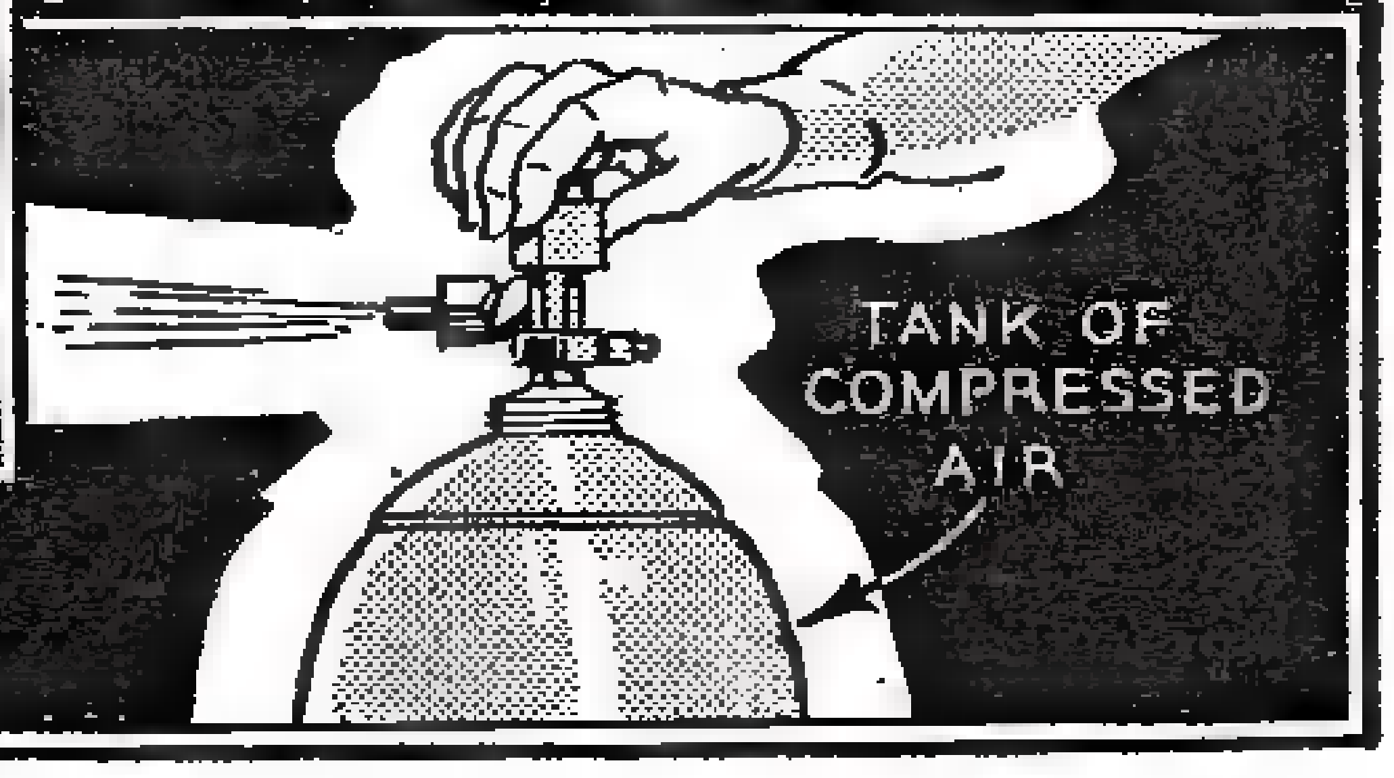
Whir and roar of stunting airplane is realistically reproduced by holding newspaper against electric fan.


NEWS-PAPER
FAN


BERRY CRATES

Breaking berry crates provides crackling of flames for fires.

Noise of escaping steam is made by opening compressed air valve.


TANK OF COMPRESSED AIR

TEMPERING SHOP TOOLS

EVERY mechanic should know how to temper his own chisels, plane knives, drills, and other shop cutting tools. Any tool which discolors while being sharpened on an emery wheel will never hold its edge.

Using either a blow torch, forge fire, or acetylene torch, heat the cutting end of the tool, back for about one inch, to a cherry red, and plunge it into a solution of ½ gallon linseed oil, 8 ounces baking soda, and 4 ounces copper sulphate.

Now buff the cutting end to brightness on an emery buffer, not a solid emery wheel.

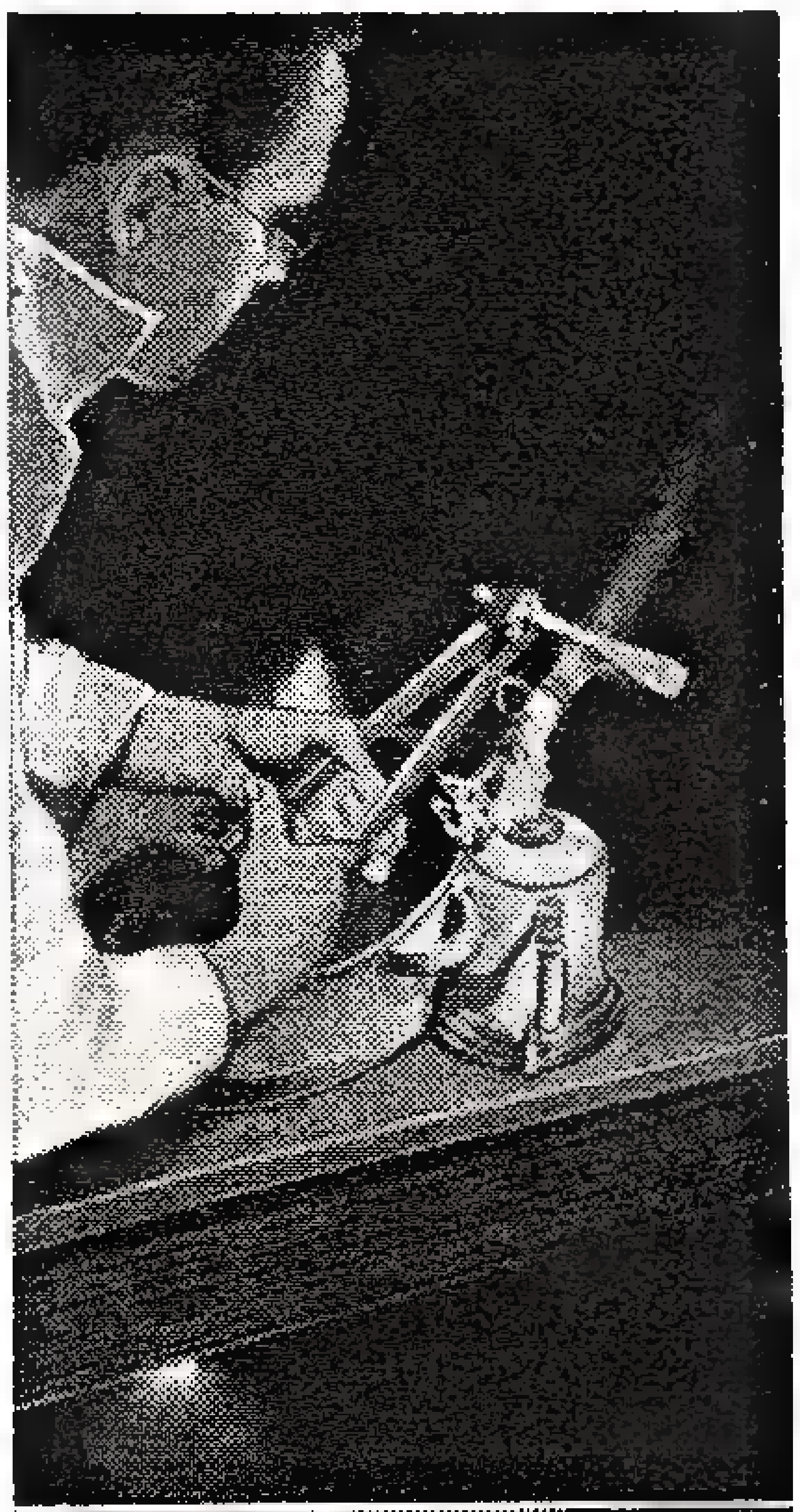
Second Heating Tempers Tool

After polishing, heat the middle of the tool over a well-charred forge or with a blowtorch, turning the tool slowly. The first heating hardens the tool, while the second softens it for whatever use it is intended. This is judged by the color of the heated metal. If the tool is a cold chisel, to be used in cutting mild steel, heat until the dark blue color appears, then plunge into the tempering solution.

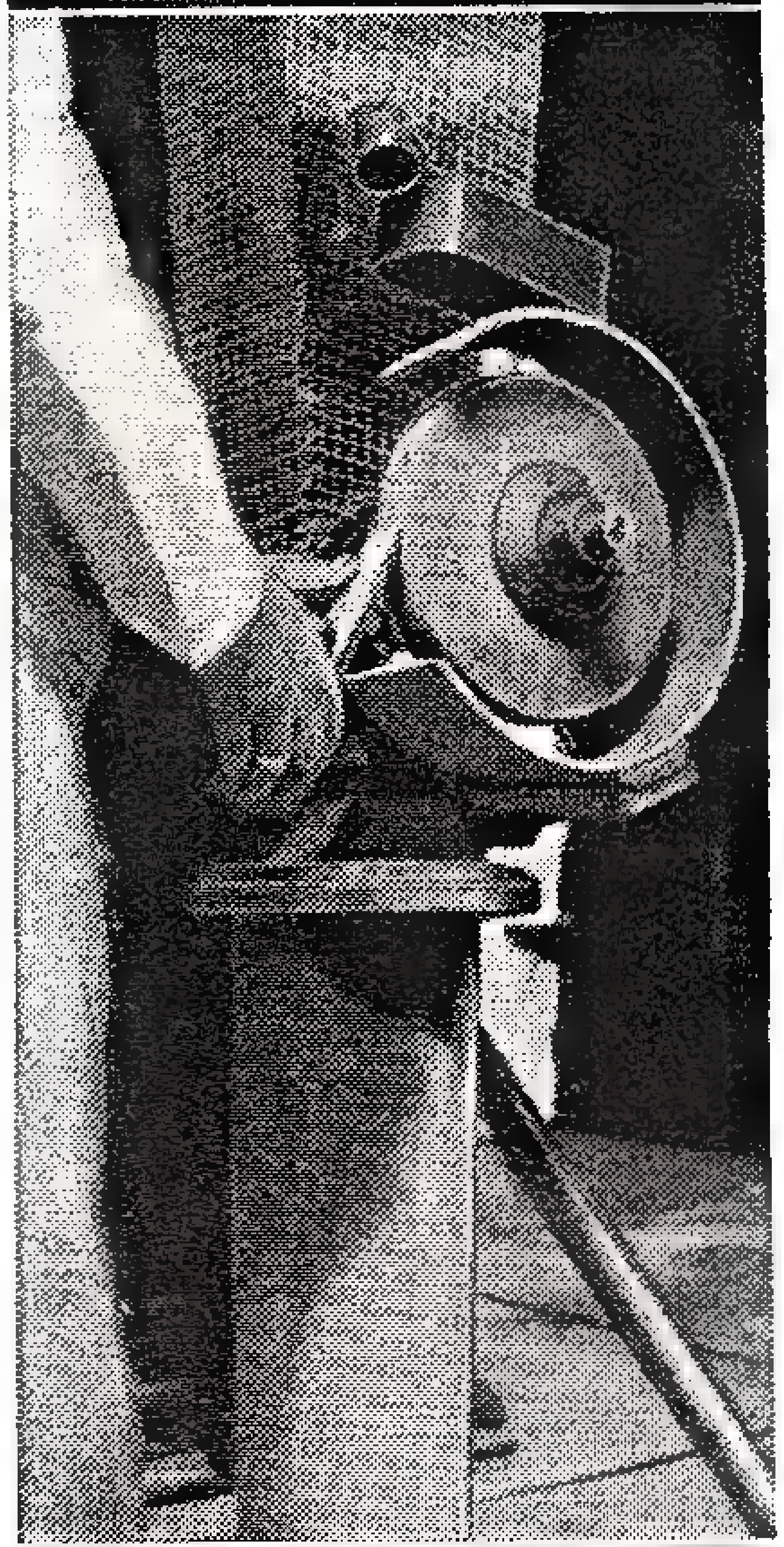
For cutting chilled cast iron, automotive bolts, and hard steel objects, stop the heating at the light blue color. If the chisel is dipped at the straw color, a cold-cut chisel which will cut spring steel is obtained.

Hardening tools in water alone makes them as brittle as glass. This solution effectively prevents chill-cracking and crystallization on all but low-carbon steels.

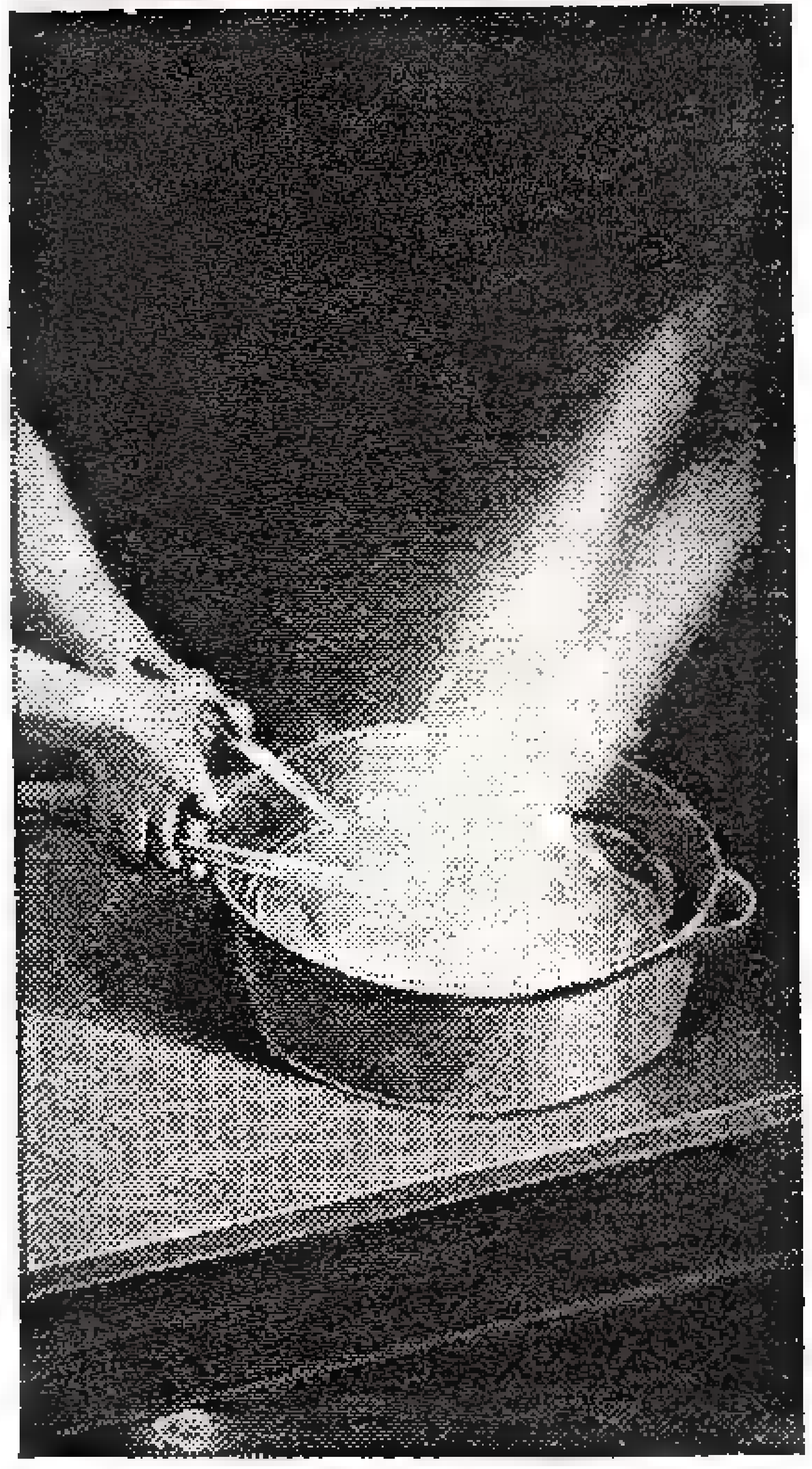
To temper long knives, immerse them lengthwise to prevent warping just when the straw color of the second heating begins to blend into the light blue.



After first tempering immersion of cold chisel, polish to brightness on emery buffer, then heat center portion only until specified tempering color appears on cutting edge. Rotate chisel slowly to insure even heat of all parts.



Tools that become discolored when being sharpened on an emery wheel will not hold cutting edge until they have again been put through tempering process. Water should be used liberally when sharpening tools with a power emery grinder.



TEMPERING COLORS

LIGHT STRAW—

SPRING STEEL CUTTING CHISELS—NEW FILE WILL NOT CUT SURFACE

BLOOD—

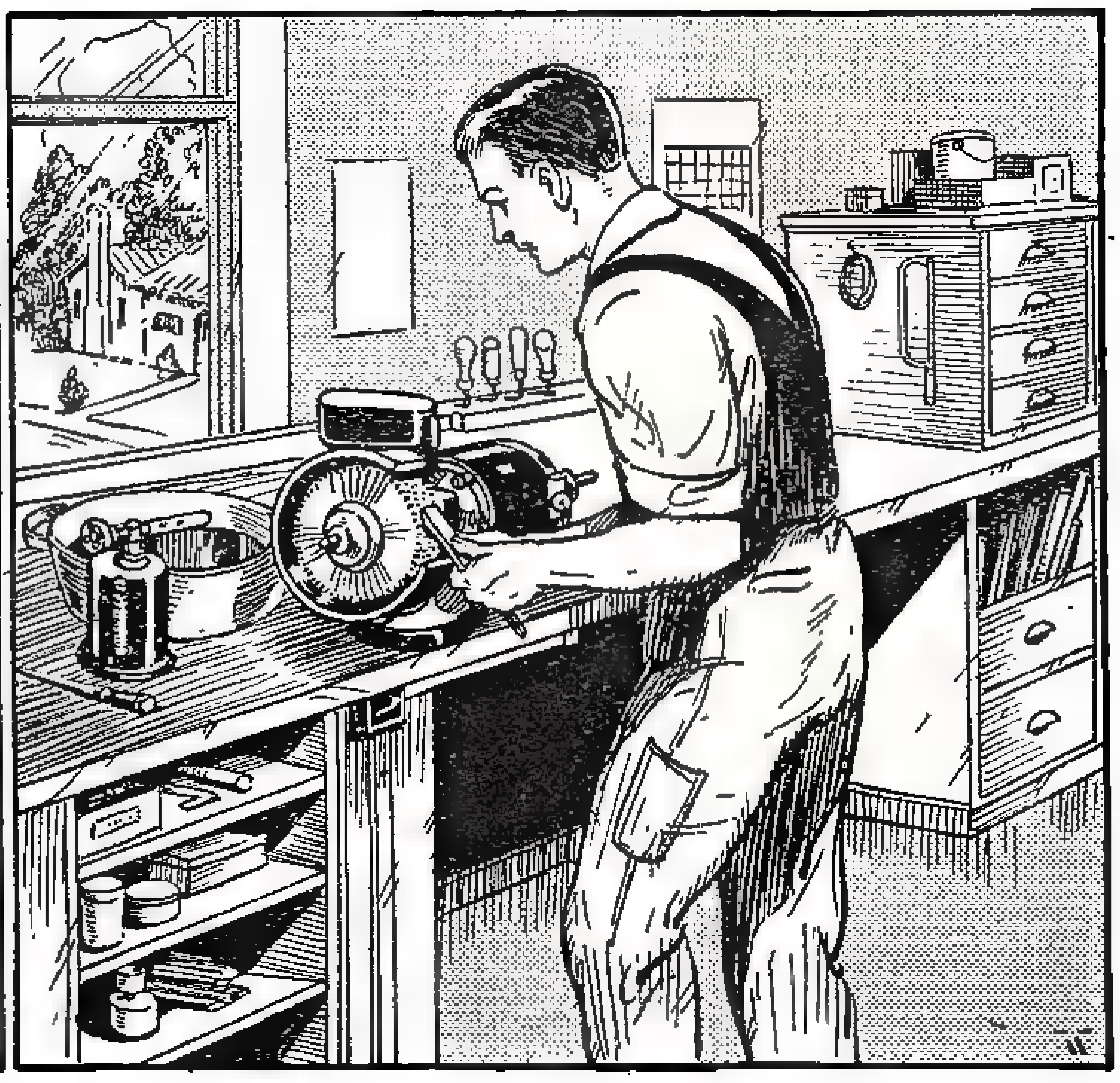
KNIVES TEMPERED AT THIS COLOR—DIP LENGTHWISE INTO SOLUTION

LIGHT BLUE—

CHISELS FOR CUTTING CHILLED CAST IRON

DARK BLUE—

CHISELS FOR CUTTING MILD STEEL



Stir heated tool about in tempering solution until steam stops rising. Above tempering colors apply to tool steel only. Drills are brought to light blue tempering color.

Semi-Automatic Clutch Is Easily Installed in Any Auto

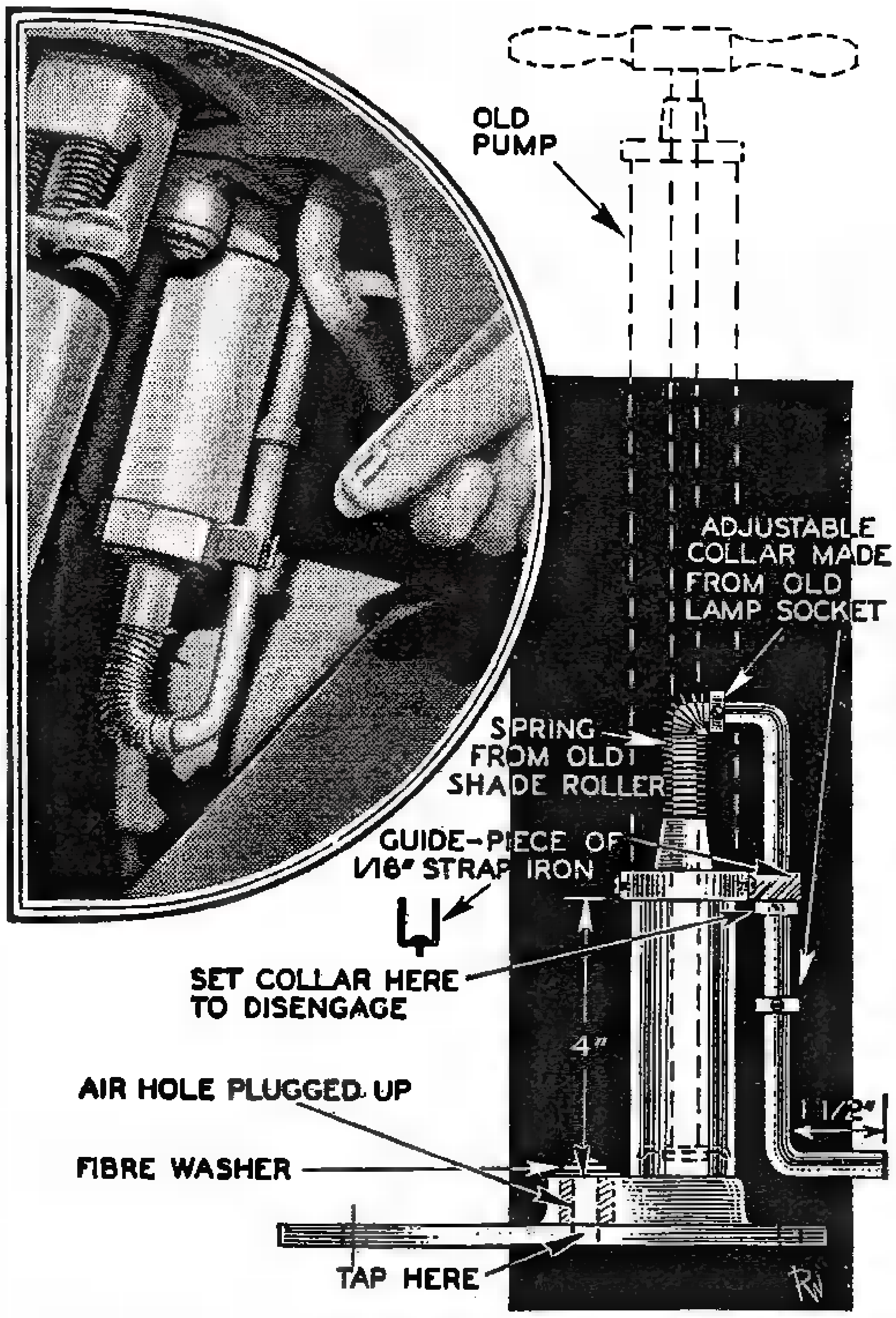
THOSE who have had experience in teaching people to drive know what a strain is placed on car parts when the foot is suddenly lifted off the clutch pedal. This simple semi-automatic clutch mechanism, made from an old tire pump, eliminates this trouble, and even makes driving easier for the experienced motorist.

Saw off the pump cylinder four inches from the base, and file out the threads from the top flange so that it will slip over the shortened cylinder. Two bolts tapped into the flange on opposite sides, hold it in place and also support a guide bracket.

The pump rod is heated, then bent as indicated in the sketches. A spring taken from an old shade roller pulls the rod out when the clutch is pressed in; collars cut off from old lamp sockets hold the spring in place and serve as adjusting stops.

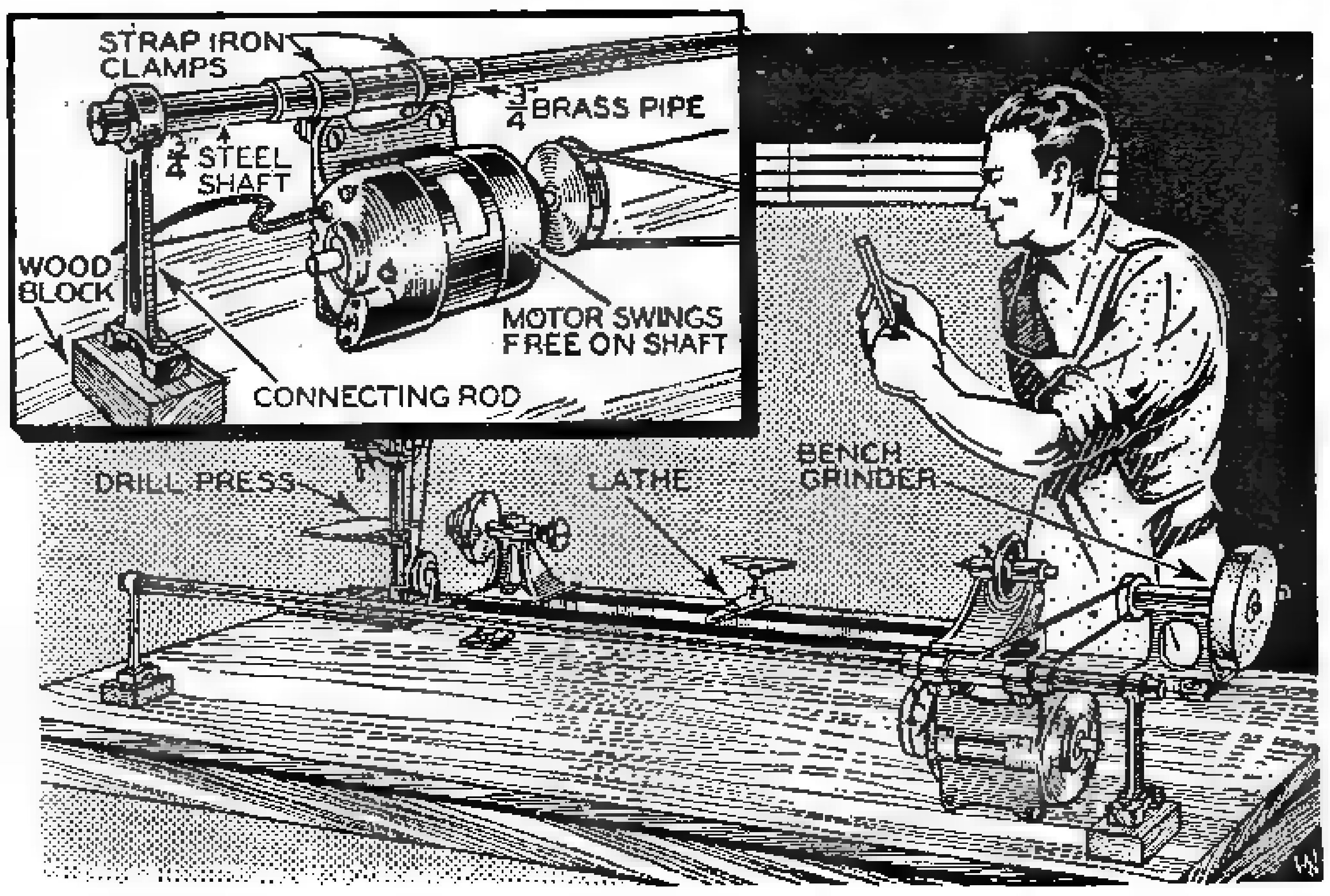
The leather washer or piston must fit snugly or it will let the clutch out too fast. The air escaping past the washer releases the clutch at just the correct speed, since the air hose hole is plugged.

The device is bolted underneath the floor boards, the bend in the pump rod hooking over the clutch pedal.


OLD PUMP
ADJUSTABLE COLLAR MADE FROM OLD LAMP SOCKET
SPRING FROM OLD SHADE ROLLER
GUIDE-PIECE OF 1/16" STRAP IRON
SET COLLAR HERE TO DISENGAGE
4"
AIR HOLE PLUGGED UP
FIBRE WASHER
1 1/2"
TAP HERE

Dimensions given here for semi-automatic auto clutch are for installation on model A Ford; on other cars pump rod will have different bends. Photo shows clutch installed.

Drive Power Tools With 1 Motor


STRAP IRON CLAMPS
3/4 BRASS PIPE
3/4 STEEL SHAFT
WOOD BLOCK
MOTOR SWINGS FREE ON SHAFT
CONNECTING ROD
DRILL PRESS
LATHE
BENCH GRINDER

Suggested arrangement of power tools for use with universal motor mounting. Four-foot length of shafting is sufficient for most installations, and will not sag under motor weight.

WITH this universal motor mounting, quickly constructed from piping and a few odd auto parts, only one motor is needed to drive the different shop power tools.

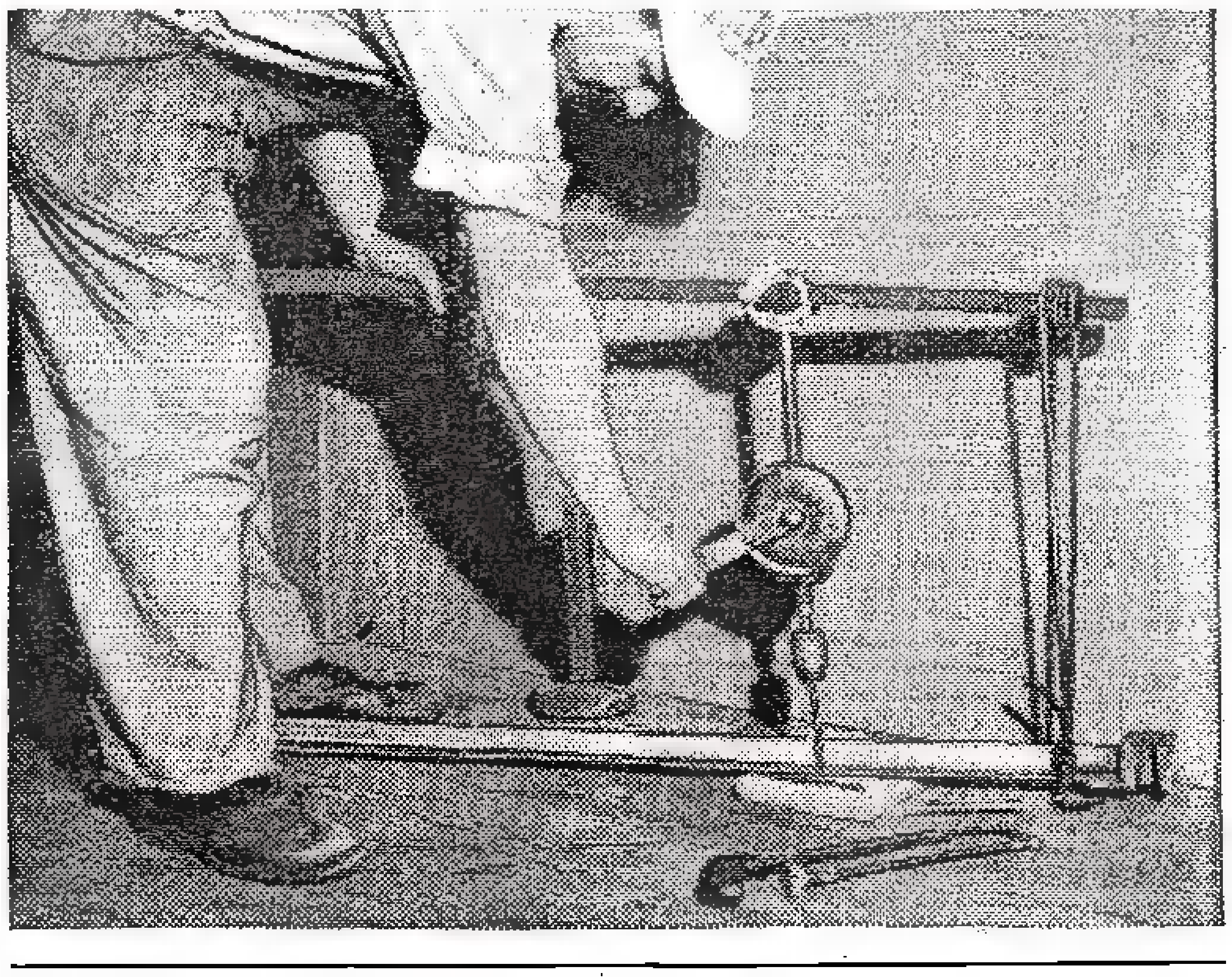
The motor floats freely on its sliding shaft hanger, its weight automatically maintaining correct belt tension.

Any desired length of ¾" steel shafting is supported on the workbench by old auto connecting rods, blocks being placed under each support to give the motor clearance above the workbench. The sliding hanger to which the motor is fastened with strap iron clamps is a 12" length of ¾" brass pipe fitting snugly over the shafting.

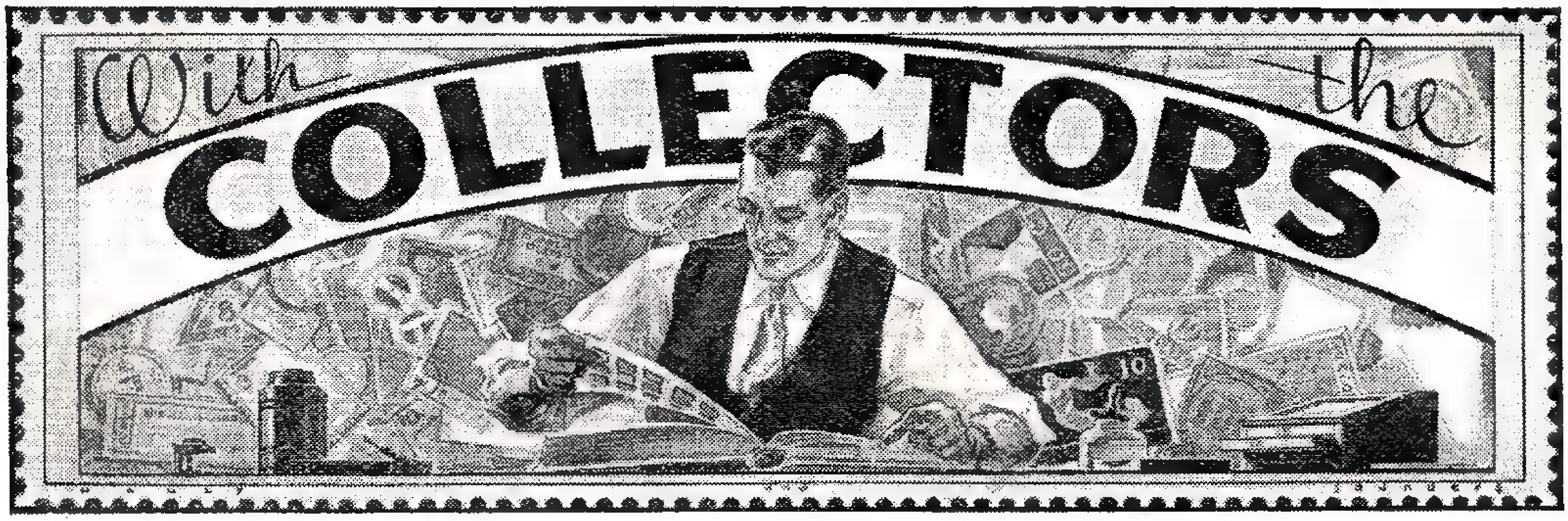
"Bearing Down" on Breast Drill

IN USING a breast drill in cramped quarters it is often difficult to apply the necessary pressure for drilling. To speed up drilling, tie a 5 foot length of wood or angle iron to the top of the drill with rope at a point about one foot from the end.

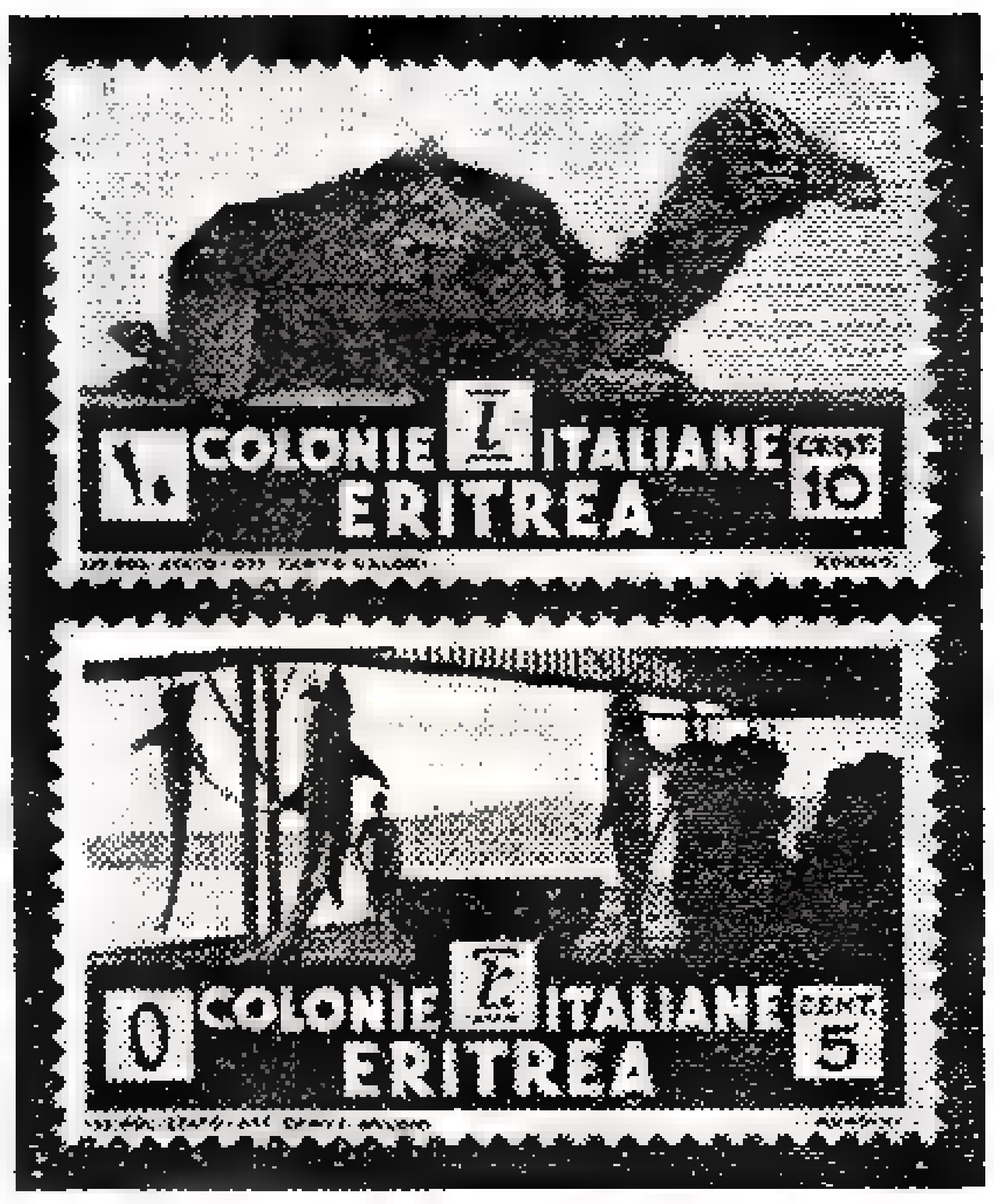
The short end of the lever is tied to the work with rope, chain, or wire, and the longer end pressed down.



Using lever to apply force to breast drill when working in awkward positions. Setup is ideal for metal-drilling.



Dromedary, Fish on Africa Stamps



Above stamps were issued recently by Eritrea, Italian colony on shores of Red Sea in Africa.

ITALIAN colonies, taking a lesson from their French neighbors, are issuing beautifully lithographed picture stamps. A recent set put out by the African colony of Eritrea presents strikingly colorful pictures of a dromedary or Arabian camel, and a fishing scene along the Red Sea.

Heat Makes Old Coins Legible

VERY often the dates and inscriptions of old coins are so badly blurred that they can no longer be read. Bring a small block of iron to almost white-hot heat and place the coin upon it. As the heat penetrates through the coin the lettering will become clearly visible because of strains set up in the metal during the punching process.

11,000 Match-boxes in Collection

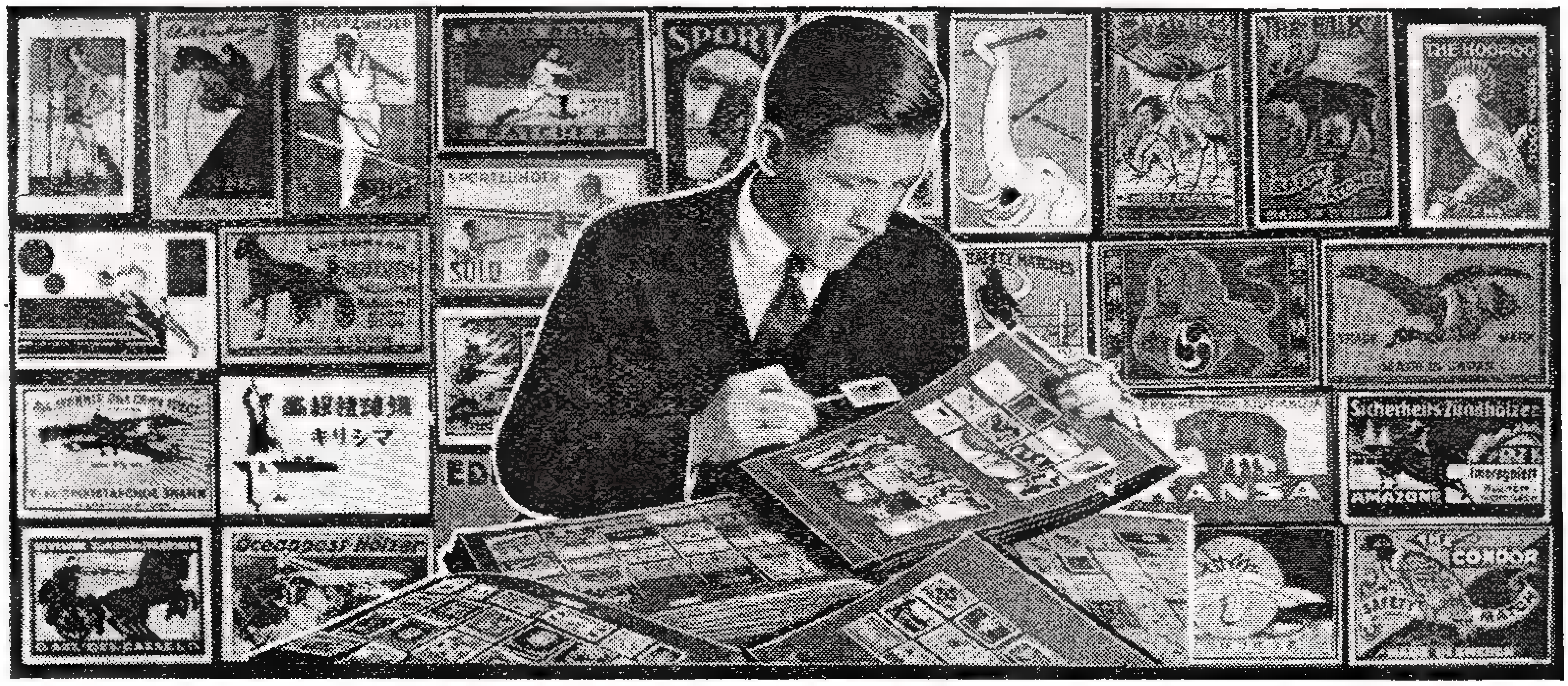
WITH over 11,000 different specimens from every corner of the globe, the collection of match-box labels made by Hermann Bresinsky, a Berlin, Germany, engineer is considered one of the largest in the world.

The arrangement of these specimens in albums is truly unique. Only labels having similar illustrations are shown on any one page. There are pages devoted to sports, to mythology, to animals, radio, and to every possible subject which might be shown in pictures. Match-box designers, it seems, have a distinct aversion to using the same scene or subject more than once.

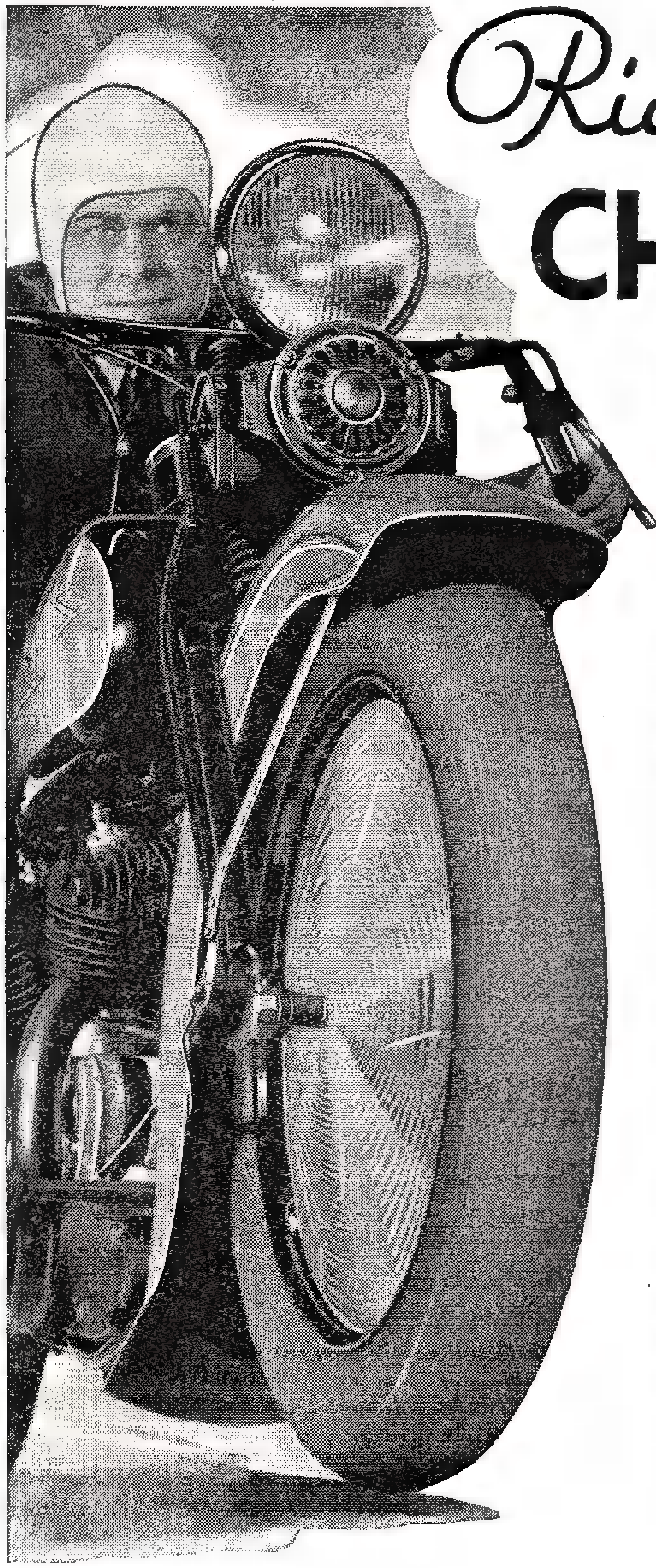
Although there are many firms throughout the world which sell small collections or single labels, most hobbyists prefer to gather specimens themselves, either by purchasing at stores or by trading with collectors in other countries. The hobby finds a great host of followers among royalty and commoners alike in England and European countries.

The labels are removed from the wood or cardboard cartons by soaking in hot

(*Continued on page 116*)



Hermann Bresinsky adds new specimens to his 11,000 variety collection of match-box labels. Labels selected at random from his album pages, showing sport, animal, transportation, and bird subjects, are pictured in the background.



Ride the CHAMPION Motorcycle

FEEL the thrill of power that has won victory's checkered flag for Harley-Davson on track and hill all year.

Seldom has one make of motorcycle won so many outstanding victories in a single season. In races, endurance runs, and hillclimbs Harley-Davidsons have scored an amazing total of wins and clean sweeps.

You may never race your Harley-Davidson, but the surging power, flashing speed, and rugged durability are there to call on when you need them —and all riders know Harley-Davidson as the CHAMPION.

Do you know how *easy* it is to buy a Harley-Davidson, and how *little* it costs to run? Let your Dealer tell you about his easy-pay plans, and show you how readily you can afford "The Greatest Sport on Wheels."

Send the Coupon for illustrated literature.

Ride a HARLEY-DAVIDSON

Mail this Coupon

Harley-Davidson Motor Co., Dept. MM, Milwaukee, Wis.

Interested in Motorcycling. Send illustrated literature. Postage Stamp is enclosed to cover cost of mailing.

Name ________________

Address ________________

My age is ( ) 16-19 years, ( ) 20-30 years, ( ) 31 years and up. ( ) under 16 years. Check your age group.

ADLETS FOR HOBBYISTS

STAMPS

ZANZIBAR! Packet queer freakish stamps from Zanzibar, Algeria, Sudan, Malay States, Victoria, Gold-coast, Nigeria, British Colonies, Souamericans. Don't delay! Don't wait. This whooping packet free for 5c postage. Gray Stampco, Dept. M.M., Toronto, Canada.

FREE Packets! Earn Stamps and money selling our nickel packets. Send 3c for list and particulars. Yakima Stampco, Yakima, Washington.

CANADIAN—High Quality. 50 Variety 50c; 75 variety $1. Cash with order. Porter & Buckland, Box 1703, Winnipeg, Canada.

STAMPS! 100 diff. 2c; 500 diff. 35c; 1,000 diff. 90c. Tatham Stampco, D9, West Springfield, Massachusetts.

105 DIFFERENT, including Congo, Hyderabad, Guinea, etc., 3c to approval applicants. Extra—Airmail Set Free with above. H. Huonziker, Box 225, Minneapolis, Minn.

FREE—Foreign coin, banknote, and large illustrated coin catalogue—4c postage, Souvenir California gold quarter size 26c; $½ size 53c; both 65c! Round or octagon, set of each $1.30! Approvals with each order. Tatham Coinco, West Springfield—9, Mass.

STAMPS Sent on approval. 50% discount. Fred Herzberg, 197 Grantley Ave., Elmhurst, Illinois.

ALBUM, 4100 Spaces; 215 Foreign - U. S.; Twenty Airmails; 25 Japan; Tongs; Hinges. 75c. Burtis Company, Saratoga, N. Y.

HIGHEST Prices Paid for your stamp accumulations. Doak, Fresno, Ohio.

HEADQUARTERS—Stamp Collectors! Complete stock Penny Approvals and Lowprice Sets. Request selection. Elyria Stamp Company, 437MM, Elyria, Ohio.

SPECIAL Offer: 635 all diff. guaranteed genuine stamps, including: Spain beautiful commemoratives, Tannou Touva first issue, showing the wheel of life, India, Liberia, Victoria, Nicaragua, Persia, Australia, Turkey 50 Piaster, Greece cpl. set, South Africa, Costa Rica, Ceylon, Abyssinia 1894, showing "the lion of Judah," Russia, rare Provisionals and money stamps cpl. sets, Philippines, Bosnia cpl. set, Saar Pictorials, etc. The entire lot of considerable catalogue value for only net $1. Frasek, Inc., Lucerne 4, Switzerland.

FREE!!! Russia Ethnographic Set or Three Spain Airmails. Postage 3c. Roberts, 901-T Fourth, Bay City, Mich.

LOOK! Gorgeous packet including Uruguay (Flying Horse) airmail, Spanish air-post, triangle, and ship stamps, only 5c to approval applicants. Royale Stampco, South Pasadena, California.

100 DIFFERENT Stamps from hundred countries $1.00. 12 Stamps of Africa 10c. Square Deal Stamp Co., 316 Ontario Ave., Sheboygan, Wisconsin.

COINS

OLD Coins in your pocket may mean fortune to you. Some worth up to $2000.00. Send dime for list. Old Coin Shop, Topeka, Kansas.

$5 to $500 EACH paid for Old Coins. Keep all old money. Get posted at once. Send 10 cents for Illustrated Coin Value Book 4x6. Guaranteed Buying and Selling Prices. Coin Exchange, Box 17, Le Roy, N. Y.

OLD MONEY Wanted. $5.00 to $2,500.00 each paid for old coins. Buying catalog 10c. Robert Cohen, Box 483, Muskogee, Okla.

CALIFORNIA gold, quarter size 27c; $½ size 53c; 100 different stamps and catalogue coins & stamps 10c. Norman Shultz, Salt Lake, Utah.

WE BUY 1907 Indian head cents. Full information one dime (coin). New Miss Mattick Co., Box 3455, Altoona, Pennsylvania.

WE Purchase All Indianhead Pennies. Pricelists 10c. Photonumismatic, 100 Forsyth, New York.

WILL buy any old US coins. Send list of coins you wish to sell for prices. Highest prices paid. Ed. O. Webb, Box 592, San Jose, California.

Removing Paper From Used Stamps

TO REMOVE paper from the backs of stamps, soak them in hot water for at least fifteen minutes. The adhesive used on the stamps is dissolved in the water, and the stamps float free of their paper backing.

Pick the stamps out of the water, then place them face downward on some blotting paper or newspaper sheets for drying. If additional sheets of absorbent paper are placed over the stamps and a few books used as weights, the stamps will dry perfectly flat.

Unused stamps can be removed from paper without losing too much of the gum by placing them, paper side down, upon a moistened blotter.

Some stamps, especially those from British colonies, have a very tenacious gum, and may have to be soaked for an hour or so.

It is often possible to tear the paper away from stamps without soaking. By carefully peeling the paper from the back of the stamp, working inward from all the edges, there is little danger of tearing the stamp. The stamp should not be bent during this procedure. Practice a little with cheaper stamps before trying this with your prize specimens.

11,000 Match-Boxes in Collection

(Continued from page 114)

water. They are then carefully dried between blotters or sheets of newspaper, using heavy books as paperweights to insure they will not curl. Most collectors mount their labels on loose-leaf photo album pages, using either rubber cement at the corners or regular stamp hinges.

October Problems Contest Winners

TRICKY indeed were the three problems selected for the October contest. Many readers sliced up carrots, corks, wood, or even clay to determine that there were eleven pieces of cheese after the four slices were made. Other problems offered more trouble, but there were many correct answers.

This month's winners are: First prize of $10—Kenneth Swan, Newcastle, Indiana; 2nd prize of $5—Edw. O. Perkins, San Francisco, California; four 3rd prizes of $2.50 each—Richard Gress, Dayton, Ohio; Mary Cotton, Eldred, Pennsylvania; Oliver F. Fosha, Freeport, Illinois; Al Stahl, Atlantic City, New Jersey.

See page 46 of this issue for the announcement of the big $500 Home Improvement Contest.

ANNOUNCING AMAZING TYPEWRITER BARGAIN

BRAND NEW MODEL No. 5 REMINGTON PORTABLE

10¢ A DAY

MONEY BACK GUARANTEE

Remington Portable
Model 5

10 DAY FREE TRIAL OFFER

25% PRICE REDUCTION

● Positively the greatest portable typewriter bargain ever offered! Now for the first time Remington, world-famous manufacturer, offers a NEW purchase plan... only 10¢ a day buys this latest model machine! Not a used or rebuilt typewriter. Not an incomplete machine. A beautiful brand *new* regulation Remington Portable. Standard 4-row keyboard; standard width carriage; margin release on keyboard; back spacer; automatic ribbon reverse; *every essential feature found in standard typewriters!*

A Gift that Points the Way to Success

For birthday, Christmas, wedding, anniversary or graduation...give a Remington Portable. The one gift every member of the family will welcome. When Dad brings home work from the office, when Brother has reports to get out, when Sister and Mother answer correspondence . . . a typewriter will do every task faster, neater.

Make Leisure Hours More Fun

A Remington Portable can be carried anywhere and used anywhere. Catch up on correspondence. Write a diary of many experiences. Only a diary will give you a good permanent record of what you have done and what you have seen. You will want a typewriter some day. Get it now!

ACT . . . WHILE LOW PRICE HOLDS GOOD!

New wage scales in our own factories, and in the factories of the companies which make our materials, point definitely to higher prices. Stocks of machines on hand make possible the present unbelievably low cash price on this machine. Everything points to higher prices. We don't believe that we can maintain the present 25% price reduction in the face of constantly rising costs in every one of our departments. So we say . . . "Act fast!"

10 DAY FREE TRIAL OFFER

You can try this machine for 10 days without risking one penny of your money. *Not even shipping charges.* Send for complete details on this most liberal offer. Get attractive new catalogue illustrating and describing the many Remington models available on unusually low terms. Clip coupon today!

EVERY ESSENTIAL FEATURE found in Standard Machines

Buying a typewriter isn't like buying a suit of clothes. Many Remington portables, seeing 10 years of hard service are still in active use. When you buy...buy a machine with every *standard* feature. The Remington No. 5 is the most compact and durable portable ever built...includes all essential standard typewriter features. This beautiful machine represents the height of economy . . . unequalled economy in first cost . . . unequalled economy in service.

It is today the best value ever offered in typewriter history... and that statement comes from the company that has constantly *made* typewriter history. Buy now. It is a real bargain offer.

Specifications . . .

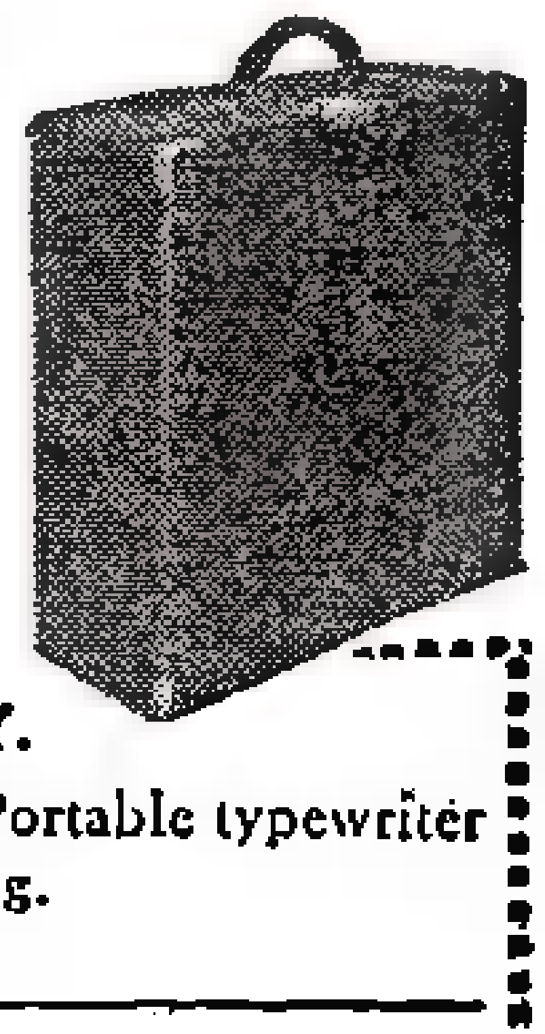
The Model 5 includes every essential feature found in standard typewriters. It has standard 4-row keyboard. Complete visibility. Standard width carriage for long envelopes. Carriage return lever of exceptional design for easy and rapid operation. Margin release on the keyboard. Automatic ribbon reverse. Back spacer. Two color ribbon shift. Variable line spacer. Adjustable margin stops. Auto set Paragraph Key (one of the most useful features found on any typewriter). Weighs 11 lbs. 13 oz. Furnished with Pica or Elite type.

TYPING COURSE **FREE**

When you get your new Remington No. 5, you will get with it... ABSOLUTELY FREE... a 19-page course in typing. It teaches the Touch System, speeds up work. It is simply written and well illustrated. Instructions are easy as A.B.C. Even a child can understand this method. A little study and the average person, child or grown-up, becomes fascinated. Follow this course during the 10-DAY FREE TRIAL OFFER that we give you on your typewriter. At the end of that time, you should be able to dash off letters faster than with pen and ink.

CARRYING CASE **FREE**

With every Remington No. 5, a FREE carrying case sturdily built of 3-ply wood. Covered with heavy DuPont fabric. Top is removed in one motion, leaving machine firmly attached to base. Can be used anywhere... on knees, in chairs, on trains.



CLIP COUPON NOW

Remington Rand Inc., Dept. 141-12 Buffalo, N. Y.

Please tell me how I can buy a new Remington Portable typewriter for only 10¢ a day. Also enclose your new catalog.

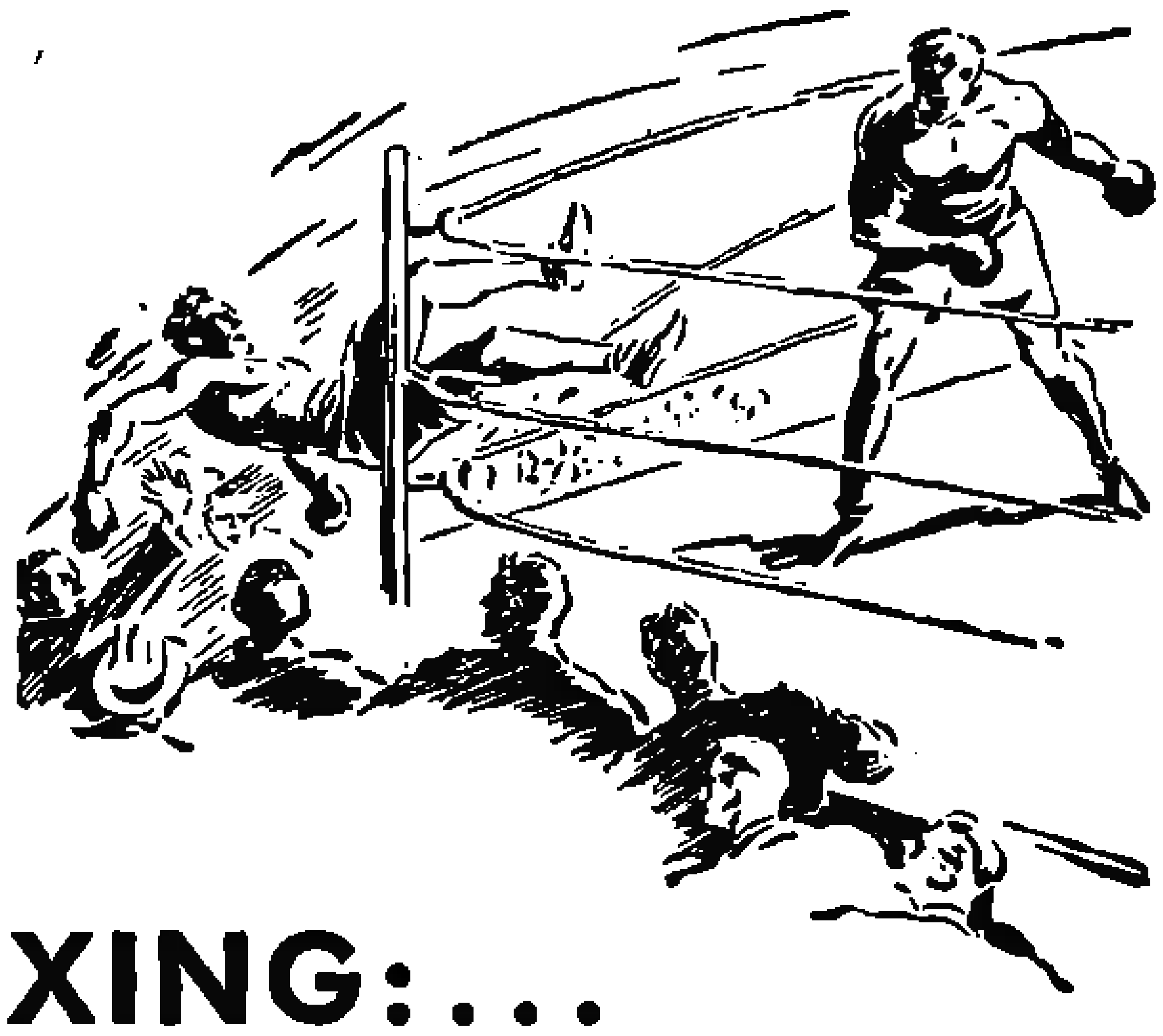
*Name*____________________

*Address*____________________

*City*____________ *State*____________

CHAMPIONS

THAT CAN TAKE IT!



BOXING:...

Remember, not so many years ago, when the "champ" stopped a real haymaker (one that started right down on the canvas) . . . how he was knocked clean through the ropes, out of the ring . . . and how he came back to crush the challenger.

TRACK: Remember that popular middle-aged marathon runner . . . winning heart-breaking races when today's champions were cutting their eye-teeth . . . and nowadays still finishing the grueling course, taking punishment, gritting his teeth, and staying up with the youngsters.

AUTOS: Remember last Winter. Remember those nights, way below zero, when so many cars froze tight . . . well, those were the cars with anti-freeze that couldn't take it . . . with anti-freeze that breaks down under the stiff punishment of modern high horse-power, and intense engine-heats . . . with uncertain anti-freeze that needs continual renewing. But the cars that rode comfortably through last Winter—nearly two million of them—were those which carried the *sure* protection—Eveready Prestone.

Eveready Prestone is an all-Winter anti-freeze . . . an anti-freeze that can take it. One shot gives your car guaranteed protection for the entire Winter. Eveready Prestone stands up under the demands of modern high-speed engines. By actual tests, it protects against rust from 5 to 20 times longer than other anti-freezes. It protects against "freeze-up" down to 60° below zero (if you wish) . . . it will not boil off. Read the Eveready Prestone guarantee and protection chart on Page 27. Here you will see how inexpensively *your car* can have Eveready Prestone protection all Winter long.

TURN TO PAGE 27

California's Mansion of Mystery

(Continued from page 85)

moved the hands and substituted a cam. Every half hour the cam releases a pendulum-like balance which permits a wire lever to contact a mercury vial. This contact starts a blower and the flutes play."

The flutes, carved of wood by Dr. Nixon, play "Waters of Minnetonka," "O Sole Mio" and "Indian Love Call."

But the most outstanding feature of the house is Isis, queen of the Nixon mansion.

This incredible mechanical woman, a source of wonder to scientists all over the world, challenges the supernatural with fantastic accomplishments. Resembling some dusky princess of the Nile, Isis reclines on a couch with a zither in both hands and will play 3000 melodies on the instrument with mechanical fingers holding picks.

Robot Woman Sings

Isis contains 1187 wheels, many jeweled movements, nine watches, several miles of fine wire, hundreds of electro-magnets, and a system of spinning discs which selects the tune she is to play. There are no recordings within her metal vitals and every note is made by an individual stroke of the picks.

"It took me three years to make the blueprints for Isis," Dr. Nixon said, "and another three years to complete the figure."

Explanation of the mechanics involved would require an entire volume, but there is not an automaton in the world like Isis. With a thermometer and an electrical circuit that goes through one arm, Isis can even throw off her veil if the temperature is too high for her comfort.

The mechanism is so delicately arranged that it can be affected by vibrations from the proximity of a stout man or woman. One recent night a singer was entertaining Dr. Nixon's friends when suddenly Isis, moved by the vibrations of the man's voice, began to play "Where the River Shannon Flows."

Home Has Disappearing Hat Rack

In the hallway of Dr. Nixon's home is the "disappearing hat rack."

"You see, I didn't want a row of hats to disturb the beauty of line in the panel carvings," he said, "so I arranged a hat rack that folds back out of sight into the wall with a simple turn of a hinge."

This love of beauty is reflected in Dr. Nixon's "Death Valley" room. Here, with a sand floor and rocks brought from Death Valley as a background, hangs a huge panoramic painting of the famous desert. The "magic flute" mechanism is in this room, and a fountain plays in the center of the floor.

Scientist, student, prodigious worker Dr. Nixon may be, but his labors give him a certain measure of amusement. For when I asked him why the weather-beaten front of the house was in such startling contrast to its beautiful interior, he said:

"Why, who ever heard of a haunted house with fresh paint?"

New MILEAGE RECORDS

WITH

VACU-MATIC

PATENT PENDING

the carburetor control that BREATHES!

What Vacu-matic users say:-

CHRYSLER

Have tried the Vacu-matic and it sure is fine. Better, pick-up with a 30% gas saving.—John C. Martin, Pa.

V-8 FORD

I installed both Vacu-matics and they work excellent. On my own V8 Ford I notice wonderful performance in pickup, get-away and gas saving. — Burt Burnett, Mich.

BUICK

Everything you claim about Vacu matic is true. I now get 20 miles to the gallon. Before I was only averaging 15½ miles. — C. Constantino, Fla.

PLYMOUTH

I am amazed at Vacu-matic performance. It's giving me 5 more miles per gallon. - Walter Zielinski, Ill.

OLDSMOBILE

I am well pleased with Vacu-matic on our Oldsmobile. A test proved it to give 18 miles per gal. Before we considered 13 good. — Arthur Williams, N Y

SAVES $180 A YEAR

On my Plymouth 6 I obtained an average of 22 miles per gallon, an increase of 7 miles. This means a saving of $15 a month or $180 a year. F. S. Peck, Calif.

CHEVROLET

Please send me a Vacu-matic for a Model A. The mileage on my 1933 Chevrolet jumped from 18 to 22 miles per gal. with Vacu-matic. — Paul P Haas, Mass.

ALL WELL PLEASED

Enclosed find order for 12 more. Everyone I have sold is giving from 4 to 6 more miles per gallon. I have 3 more orders for V8 Ford. Everybody is well pleased.—J. O. Carll, Texas.

MODEL A FORD

Have been using the Vacumatic for a month. I used to get 20 to 22 miles per gal. Now I get 30 to 33 miles. It is amazing the difference it makes.—James W. Barr, Canada.

NASH

On my Advanced 6 Nash gained 17½% in mileage. The car will idle down to 3 miles an hour and then take gas without a complaint. — J Showalter, Mo.

FRANKLIN

With Vacu-matic I have increased my mileage from 10.1 to 14.2 miles per gallon. I figure I save over $75.00 a year in gasoline. R. K. Radtke, Wis.

DODGE

Just completed 2310 miles on 92 gallons in my 1933 Dodge 6. This figures 25 miles while before I averaged only 20 miles per gal. on trips. — Al Fruzyna, Calif.

USERS REPORT

3 to 7 MILES MORE per gallon

MOTORIST SAVES $180.00 a YEAR

GUARANTEED GAS SAVINGS!

AT LAST! Automotive engineers have smashed down the barriers to perfected combustion! The new VACU-MATIC solves the secret of greater power! With almost magical action, this amazing invention instantly puts new life and pep in any motor. It adds mileage to every gallon of gasoline . . . produces split-second pick-up, sensitive accelerator response, greater speed and smoother running . . . unfolding a new driving thrill for you!

Entirely New — Nothing Like It!

The self-starter—four wheel brakes—knee action—streamlining . . . and now VACU-MATIC! The greatest motor improvement of recent years! With it, engineers have achieved a practical means of AUTOMATICALLY balancing air and gasoline in correct proportions for ALL speeds! Functioning directly with the manifold vacuum, VACU-MATIC actually "breathes" when needed, giving your motor correct combustion. Sharply cuts fuel wastes, saves dollars in gas costs, reduces carbon and gives your engine new pep, greater power and longer life.

Agents and Salesmen

If you are interested in earning up to $15 daily, check coupon. Exclusive territories now being granted.

Fits All Cars

VACU-MATIC is constructed of six parts, electrically welded into one unit, correctly adjusted and sealed at the factory. Nothing to regulate. Any motorist can attach VACU-MATIC in ten minutes. Once in, its only reminder is the surge of instant power and speed it gives to the motor and the savings it affords your pocketbook.

The VACU-MATIC Co., Wauwatosa, Wis.

The VACU-MATIC proves itself on every car. It is guaranteed to give worth-while gas savings, quicker pick-up, and more power or it costs you nothing. Why get poor mileage when it is so easy to save gas with VACU-MATIC?

Free Details

Learn about this remarkable device that so greatly affects the entire performance of your motor. Learn why your car is costing you extra money to operate without VACU-MATIC. See why your VACU-MATIC equipped car will leap away from traffic without sputter or hesitation. Discover a new driving thrill and enjoy the savings. Get the facts! Write today!

FREE OFFER COUPON!

THE VACU-MATIC COMPANY
62 W. State St., Wauwatosa, Wis.

Gentlemen: Please send me full particulars concerning the Vacu-matic and details of your Free Offer. This of course does not obligate me in any way.

Name..

Address..

City.................................... State......................

☐ Check here if interested in selling proposition.

Thousands are Amazed OVER *Marvelous Results* WITH LOW PRICED AIR CONDITIONER

SAVES 25% of COAL BILLS
BY ADDING MOISTURE TO THE AIR

CAPLAIR
2 Gal. Capacity

10 DAYS FREE TRIAL

Wonderful Invention

NEW PATENTED PRINCIPLE

Perhaps no Invention in years has accomplished so much as CAPLAIR. Efficiency and Low Price makes it practical for quick sale and in line with a necessity for any home. The public are air condition minded. They know what it means to their health. But the startling advantage that wins public favor is it actually saves coal bills.

Needed in Every Home

Easily fits any radiator and once in the home every member of the family enjoys better health. Freedom from colds. Hot Dry Air cuts down our resistance. CAPLAIR gives nature a chance to safeguard the nose and throat and ward off respiratory diseases. The scientific features of CAPLAIR are covered by patents and are not found in any other device of its kind. CAPLAIR is Automatic, it evaporates the proper amount of moisture according to the heat in the radiator. Simply add water.

WATER EVAPORATION IS ESSENTIAL
Better Health — Freedom from Colds

The winter months are long months and you need heat but you need humidity with the heat or you suffer the consequences because hot dry air seeks moisture and gets it and each living object in the room is a victim. Water evaporation is necessary. Your health demands it! Beneficial to the system! Nature provides a body temperature of 98.6° F. When the body temperature rises it arouses the nervous system. Maintain uniform body and room temperature with humidified air.

BIG FIELD! BIG DEMAND! BIG PAY!!

No matter what you have ever sold or if you never sold anything before. This is your big chance. Even beginners can make Big Money. There is no secret about the profits you make, even spare time pays big. The only way you can limit your profit is to limit your calls each day. CAPLAIR will sell itself if you give it the opportunity. Territory is going fast but the field is big! Every home is interested in health protection and sales come easy, the demand is enormous. If you are interested in making real money don't delay. ACT TODAY!

The CAPLAIR Maintains Humidity At Proper Health and Comfort Levels

It is easy to understand why CAPLAIR is so effective to GOOD HEALTH in the home. It adds proper moisture to the air you breathe according to the heat in the room. Thus you can avoid the opening and closing of doors and wasting of heat. Respiratory diseases are common during the heating months. No one is immune! Protect the health of the family. Let CAPLAIR add the proper humidity.

● ***BE THE FIRST IN YOUR LOCALITY***

MONEY BACK GUARANTEE

MAIL THIS COUPON TODAY for AMAZING *10 DAY TRIAL OFFER*

LANDON & WARNER, Dept. K27
360 N. Michigan Ave., Chicago, Ill.
Gentlemen:

Check Radiator Thickness						
6	7	8	9	10	11 inches	
☐	☐	☐	☐	☐	☐	

Send me one CAPLAIR Air Conditioner, postage PREPAID. I will try it for 10 days under terms of my Money-Back if not satisfied.

☐ $4.65 enclosed. ☐ Send C. O. D. $4.65.

Name..

Street..

City.................................... State..............

P. S.—You save money by ordering 2 CAPLAIRS for $9.00.

Enjoy Football With This Game

(Continued from page 97)

yard line, the dice would be thrown, and if a red 5 and a 3 appear, the number would be 53. On line 53, under "Kickoff," it would be found that the kick traveled 45 yards. Should the ball go out of bounds (OB), the yardage gained is found under Kickoff after throwing the dice again.

The "Receiver" now has a choice of two plays—Kick Return or Fair Catch. Selecting one, he throws the dice. If a Kick Return is called, the figures indicate the number of yards which the ball was run back. If the dice shows 32, RTD on the chart indicates the ball is run back through the entire defending team for a touchdown. F indicates a fumble, it then being first down and ten yards to go from the point where the kick was grounded.

Should a Fair Catch be called, G indicates it is good, it then being "first and ten" from the point where the kick was grounded. The first play after a good fair catch, however, must be either a line buck, end run or free kick. F indicates the catch was fumbled, the ball going to the opponents. F-R tells that the ball was fumbled but recovered, and for this game means the same as G. F-R 31 shows that the fair catch was fumbled, the ball falling to the ground, and was then recovered and run for a gain of 31 yards.

(Continued on page 128)

Behind Scenes on Movie Battlefields

(Continued from page 71)

For the mines I bury cardboard bombs, containing either dynamite or powder, in holes two feet deep, whose sides are carefully rounded out. The bombs are covered with bone charcoal which will not burn. When these fellows explode, they spread like a mushroom and the rounded sides force the power to be expended straight up.

Dynamite caps provide the "plopping" of machine-gun bullets. Each is wrapped in cotton and tape, connected with wires leading to the firing board and buried two inches.

Occasionally airplanes join in the attack and it becomes my task to chase them through the air with shrapnel or anti-aircraft shells. For this purpose, as well as for shells bursting over the troops, I fire cardboard bombs from cannons placed along the sidelines and pointing down the field. The cannons are made by installing three or more five-inch steel pipes, welded shut at the lower end, in wooden blocks 16 inches square. To fire them I again have only to close switches, the altitude reached by each shell depending upon the charge and angle of elevation.

Whether anti-aircraft or ground fire is called for, I fire it all from memory. Up to this time I have injured only one man. He was a spectator who wandered too close to the explosives. A few of the 30,000 Germans, French, British, Italian, Austrian and American troops have wound up a hard day grimy

(Continued on page 128)

So you're going BACK TO WORK!

THAT'S FINE! And more good news is that improved business conditions are sending thousands of other men back to work.

But don't let your enthusiasm dim the facts. *Business today, and from now on, has a new standard of service.* It is a standard of efficiency —*of training*—and to ignore it is inviting another long stretch of unemployment.

For your own sake, man, for your family's sake, do not flirt with this disaster!

Especially foolish when you can acquire so easily the training you must have . . . when you can make yourself more valuable on your job by devoting a small portion of your spare time to study. In years past millions of men have come to International Correspondence Schools for this training. Today, with its unusual conditions, is bringing many of these men back for *additional* training, to meet and solve the problems of a new day—and many thousands who have decided to face the facts and assure their own futures. Will you face the facts? Do you want to assure your future? Then this coupon is a challenge to you! Why not mark and mail it—right now? *If desired, you can arrange to complete the course of your choice through easy monthly payments.*

INTERNATIONAL CORRESPONDENCE SCHOOLS

"The Universal University" BOX 2316, SCRANTON, PENNA.

★ Without cost or obligation, please send me a copy of your booklet, "Who Wins and Why," and full particulars about the subject *before* which I have marked X: ★

TECHNICAL AND INDUSTRIAL COURSES

☐ Architect
☐ Architectural Draftsman
☐ Building Estimating
☐ Wood Millworking
☐ Contractor and Builder
☐ Structural Draftsman
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☐ Electrical Engineer
☐ Electric Lighting
☐ Welding, Electric and Gas
☐ Reading Shop Blueprints
☐ Telegraph Engineer
☐ Telephone Work
☐ Mechanical Engineer
☐ Mechanical Draftsman
☐ Machinist ☐ Toolmaker
☐ Patternmaker
☐ Heat Treatment of Metals
☐ Bridge Engineer
☐ Bridge and Building Foreman
☐ Gas Engines ☐ Diesel Engines
☐ Aviation Engines
☐ Automobile Mechanic
☐ Plumbing ☐ Steam Fitting
☐ Heating ☐ Ventilation
☐ Sheet Metal Worker
☐ Steam Engineer
☐ Steam Electric Engineer
☐ Civil Engineer
☐ Surveying and Mapping
☐ Refrigeration
☐ R. R. Locomotives
☐ R. R. Section Foreman
☐ R. R. Bridge and Building Foreman
☐ Air Brakes ☐ R. R. Signalman
☐ Highway Engineering
☐ Chemistry ☐ Pharmacy
☐ Coal Mining Engineer
☐ Navigation ☐ Air Conditioning
☐ Boilermaker
☐ Textile Overseer or Supt.
☐ Cotton Manufacturing
☐ Woolen Manufacturing
☐ Agriculture ☐ Fruit Growing
☐ Poultry Farming ☐ Radio
☐ Marine Engineer

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☐ Salesmanship
☐ Advertising
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☐ First Year College
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☐ Lettering Show Cards ☐ Signs
☐ Stenography and Typing
☐ Civil Service ☐ Mail Carrier
☐ Railway Mail Clerk
☐ Grade School Subjects
☐ High School Subjects
☐ College Preparatory
☐ Illustrating
☐ Cartooning

Name..*Age*..................*Address*..

City..*State*..*Occupation*..

If you reside in Canada, send this coupon to the International Correspondence Schools Canadian, Limited, Montreal, Canada

Hunters! Anglers!
You can learn Taxidermy
ISN'T THIS MALLARD A BEAUTY, BILL?
YES, IT'S A SHAME TO THROW AWAY SUCH GORGEOUS PLUMAGE. I'M GOING TO WRITE TO THE N.W SCHOOL OF TAXIDERMY AND LEARN TO MOUNT AND SAVE MY TROPHIES.
LATER
HELLO, BILL—SAY, THOSE SPECIMENS ACTUALLY LOOK ALIVE!
YES, RAY, IT'S THE GRANDEST HOBBY IN THE WORLD. COME UP AND SEE MY DEN.
I'VE DOUBLED MY FUN FROM HUNTING AND FISHING—AND HAVE MADE $64 ALREADY MOUNTING TROPHIES FOR OTHER HUNTERS.
AND YOU TANNED THIS FOX SCARF YOURSELF? BILL, YOUR DEN LOOKS GREAT. I'M GOING TO START LEARNING TAXIDERMY RIGHT NOW!
WE CAN TEACH YOU TO MOUNT BIRDS

Great Fun and Profit. Send **Coupon** for marvelous **Free Book.** It tells **All** about taxidermy — how you can **Make Money** and have great *fun* and fascination mounting **Birds and Animals.** Save your wild-game trophies — mount for others. Also **Mount** common specimens, pigeons, squirrels, rabbits, even frogs, into humorous and useful groups — highly interesting and sell at sight. Wild-game **Not** *necessary*. Men, Women, Boys learn quickly **by Mail.** Marvelous business, **send coupon.**

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FREE BOOK

Northwestern School of Taxidermy,
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Gentlemen:— Please send me your free 48 page booklet explaining Taxidermy.

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MOUNT
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Trophies

"How To Build 20 Boats"... at all Newsstands ... 50c

325 X MICRO OUTFIT $3.95

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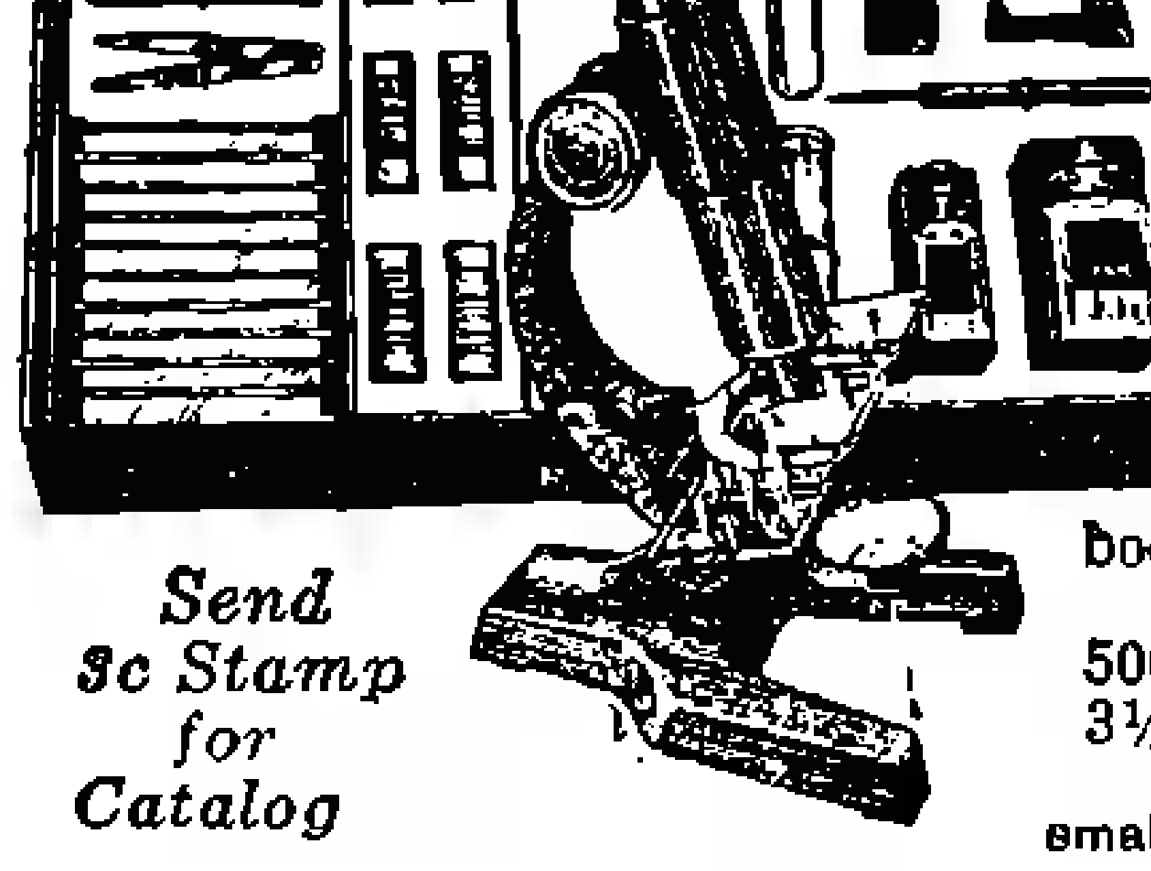


Send 3c Stamp for Catalog

New Model 3X—all American made. Micro range 80X to 325X, swivel base; adjustable mirror; focussing wheel. All nicely boxed, leatherette covered; contains specimen slides; dropper; tweezer; dissecting instrument; culture tubes; magnifier, dissecting stage; sealing liquid; 6 specimens in vials; instruction book, etc. 9x14x3''. **Very complete.**

No. 3MW—Outfit: Micro 75X [illegible] 500X; largest and best; box 12x16x3½''—$5.95.

No. 2MX—Outfit: Micro 125X, smaller; complete; box 9x12x3''—$2.49.

LEE SALES CO., Dept. M-12, 35 West 32nd St., New York

Talk on 5 Meter Wave Transceiver

(Continued from page 91)

A small strip of bakelite mounted on a stud was found to be the simplest method of mounting the two coils. Leads are fastened underneath to two small bolts, while the inner coil terminals are soldered to the heads of the bolts. A midget .0001 mfd. fixed condenser connected directly across this mounting aids in maintaining rigidity.

The 100,000 ohm potentiometer used as a regeneration control is mounted in front of the transformer. A separate single pole single throw toggle switch is used in the filament circuit, and a double pole double throw switch to change over from sending to receiving. Unless the microphone used has a switch mounted directly on it, it will be necessary to remove one lead from the panel binding post when receiving.

The seven plate midget tuning condenser is held off from the panel by a bakelite strip mounted on two studs. A bakelite or hard rubber shaft extension must be used to connect condenser to vernier tuning dial.

Only 4-foot Antenna Needed

All leads which are shown grounded in the circuit diagram are connected directly to the aluminum panel to cut down on wiring.

A very short antenna is required for ultra short wave transmission. A four foot length of copper wire attached to the antenna binding post and insulated from nearby objects will work satisfactorily.

The transmitter will operate on 90 volts, the voltage required for the receiver, but far better results are to be had if three B batteries, giving 135 volts, are used.

Filament current can be obtained from a 2 volt storage battery—in this case the 3 ohm filament resistor is omitted. If two dry cells are used the 3 ohm filament resistor must be used to cut down the voltage to 2 volts.

To put the set in operation, throw the switch to receiving position, close the filament switch, and turn the regeneration control slowly until a loud sh-sh-sh is heard. After locating the proper spot on the dial for reception of a nearby 5-meter transmitter, the dial setting is left alone for both sending and receiving.

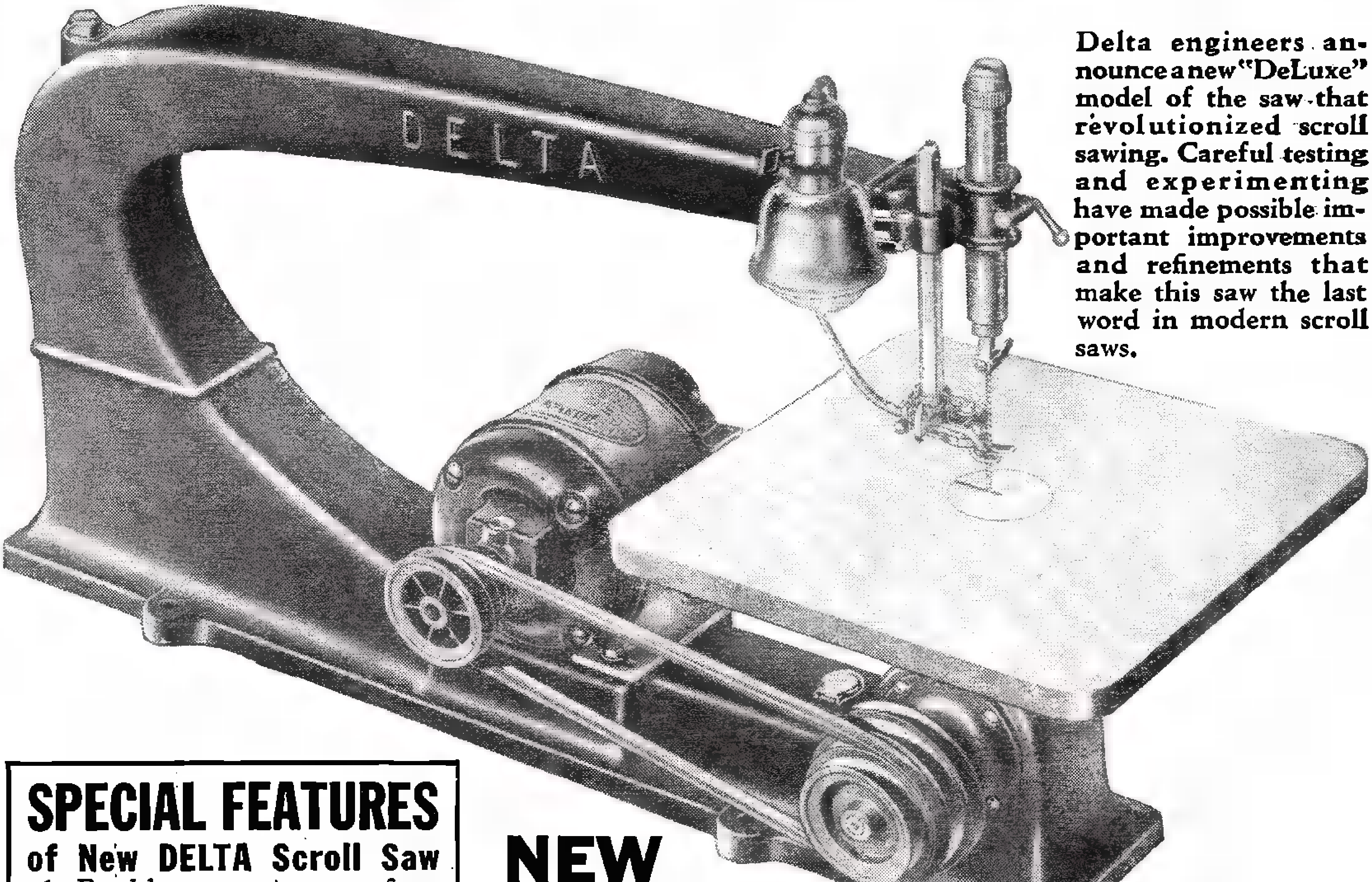
Recent changes in amateur radio license laws permit portable operation on the ultra-short waves without usual notifications to the radio inspector. It is still necessary, however, to have an amateur radio operator's license to legally operate this five meter transmitter.

M-M TRANSCEIVER BLUEPRINTS

For those readers who prefer to work from large-size shop drawings, a set of blue-line prints on this project have been prepared to sell for 50 cents postpaid. Included with the prints is a detailed list of the parts required. Copies of the booklet "How to Become a Radio Amateur" are available at 25c postpaid. Send your order to Modern Mechanix Publishing Co., 529 South 7th St., Minneapolis, Minn.

New Scroll Saw

Offers Amazing Performance and Efficiency



Delta engineers announce a new "DeLuxe" model of the saw that revolutionized scroll sawing. Careful testing and experimenting have made possible important improvements and refinements that make this saw the last word in modern scroll saws.

SPECIAL FEATURES

of New DELTA Scroll Saw

1. Enables you to run fine blades at full motor speed without danger of breakage;
2. Tilting table turns 90° in either direction;
3. Adjustable blade tension;
4. Two convenient guide positions for saws from front or side of machine;
5. Four speeds without moving motor;

and many other novel and useful features.

NEW 1935 DELTA Motor-Driven Tools

The new "DeLuxe" Scroll Saw is but one of the many new improvements and tools announced this year by Delta engineers. This year the Delta line of motor-driven woodworking tools is more complete than ever before. Delta standards of efficiency, quality, and convenience have been strictly maintained—and Delta prices still kept at their low levels. Good compact motor-driven tools are within the reach of all. Every woodworker will find the new 1935 Delta line of unusual interest.

Send for CATALOG

The 1935 catalog of Delta quality motor-driven tools is now off the press. It is crowded with photographs and information about the new line of 1935 Delta tools. It shows how Delta tools are built to stand the grind of production work, and yet are so low priced as to be within the reach of all. Send coupon so your name will be placed on the mailing list to receive the 1935 Delta catalog without delay. Enclose only 10 cents at same time for Book of Practical Delta Projects, 32 pages of new and novel things to make with over 100 blue prints, working drawings, photographs and illustrations—and complete directions.

NEW BOOK for WOODWORKERS

32-page book "Practical Delta Projects"—crowded with new and "out of the ordinary" things to make—with over 100 photographs, working drawings, and easy-to-understand illustrations. Simple, complete instructions make every project easy to follow. Every woodworker should have this book. Send 10c with coupon. 1935 Delta catalog mailed postpaid.

PRACTICAL DELTA PROJECTS
NEW & NOVEL THINGS TO MAKE

DELTA MANUFACTURING CO.,
3775 N. Holton St., Milwaukee, Wis. Dept. M-1234

I enclose 10c (stamps or coin), for which please send me one copy of "Practical Delta Projects". Also place me on your mailing list to receive 1935 Delta catalog of quality motor-driven woodworking tools.

Name...Age?..............

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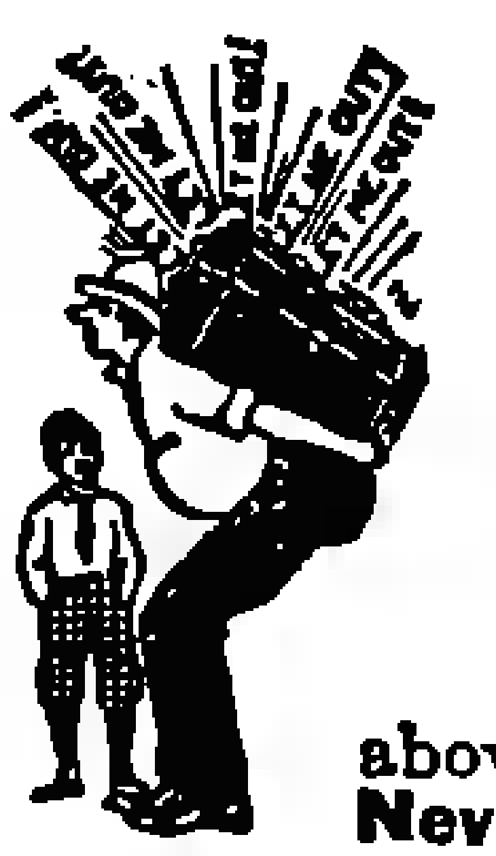
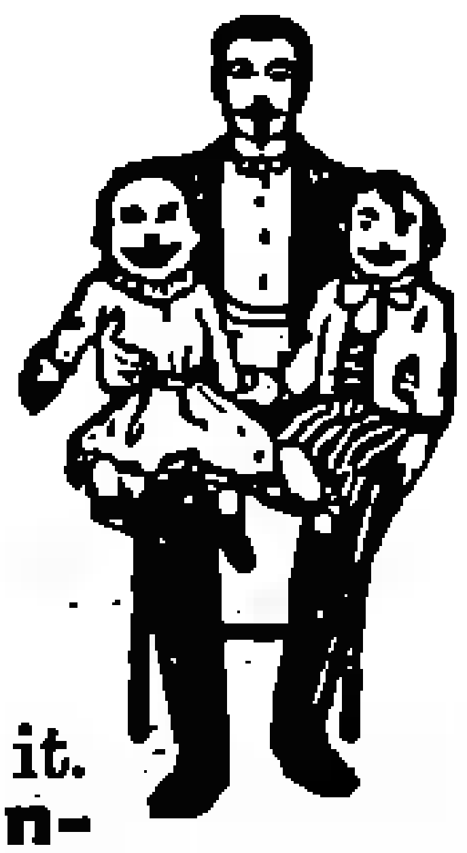
City.......... ....State.....................

BOYS! THROW YOUR VOICE



Into a trunk, under the bed or anywhere. Lots of fun fooling teacher, policeman or friends.

THE VENTRILO



a little instrument, fits in the mouth out of sight, used with above for Bird Calls etc. Anyone can use it. **Never fails. A 16-page course on Ventriloquism and the Ventrilo. All for 10c Postpaid.**

JOHNSON SMITH & CO. Dept. 719 RACINE, WIS.

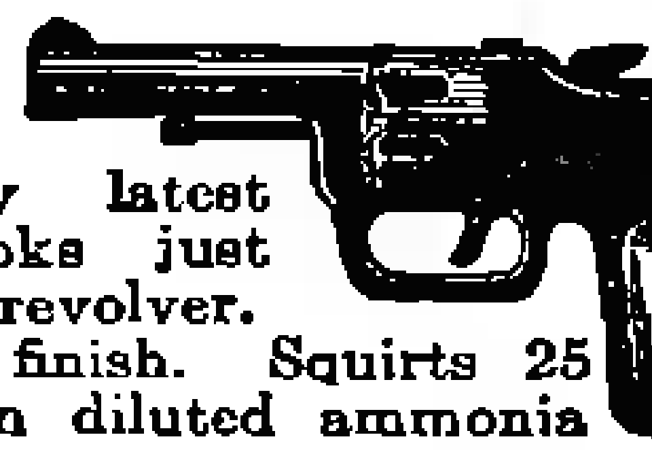
BOY AMATEUR ELECTRICIAN 10c

The HOW and WHY of electricity fully told in simple language that any boy can understand. Scores of plans and instructions for making—dry batteries, dynamos, electric motors, telegraph apparatus, telephones, electric lights, electric door bells, alarms, electric engine, rheostat, mail box alarm, electro-magnets, automatic incandescent flash, electric shocking machine, wireless telegraph apparatus, induction coil, arc light, current reverser, etc., etc. Tells all about electric wiring, static electricity, magnets and magnetism, conductors and insulators, electrostatic induction, electroscope, electrophorus, condensers, Leyden jar dynamic electricity, the voltaic cell, electromagnets, electrolysis, electro-plating, electrotyping, how to build a radio for a few cents, etc. 64 pages, 100 illustrations. **10c. postpaid. JOHNSON SMITH & CO., Dept. 719, RACINE, WIS.**

MAKEYOUROWNRADIO

Enjoy the concerts, baseball games, market reports, latest news, etc. This copyrighted book "EFFICIENT RADIO SETS" shows how to make and operate inexpensive Radio Sets, the materials for which can be purchased for a mere trifle. Also tells how to build a short-wave Receiver for bringing in foreign stations, police calls, ships at sea, etc. **ONLY 15c p-pd.**

Daisy Water Pistol



6-Shot Repeating Water Pistol—very latest design; looks just like a Police revolver. Blue steel finish. Squirts 25 feet. When diluted ammonia is used is very effective against vicious dogs, tramps, animals. 7 inches long. Very simple to load and discharge. PRICE 25c POSTPAID.

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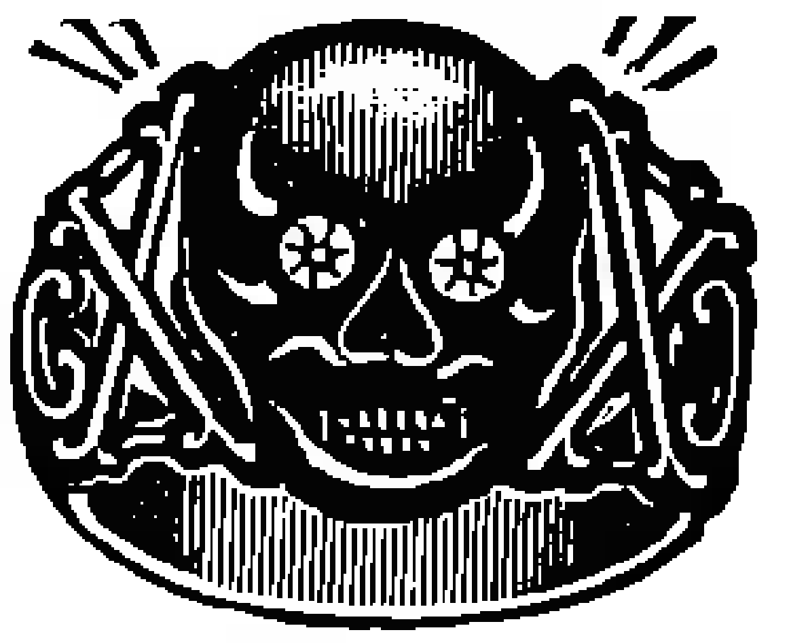
With a bunch of these bills, it is easy for each person of limited means to appear prosperous by flashing a roll of these bills at the proper time and peeling off a genuine bill or two from the outside of the roll, the effect created will be found to be all that can be desired. **Prices: 15 Bills 10c, 40 Bills 20c, 120 for 50c or $3.50 per thousand postpaid.**



Good Luck Ring 25c

Very striking, quaint and uncommon. Silver finish; skull and crossbones design, two brilliant, flashing gems sparkle out of the eyes. Said to bring good luck. **Only 25c ppd.**

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250 Magic Tricks

An excellent little book containing nearly 300 tricks for parlor or stage that anyone can do. Tricks with cards, coins, handkerchiefs, eggs, bottles, string, etc. Also Second Sight, Shadowgraphy, etc. Profusely illustrated. **10c postpaid.**

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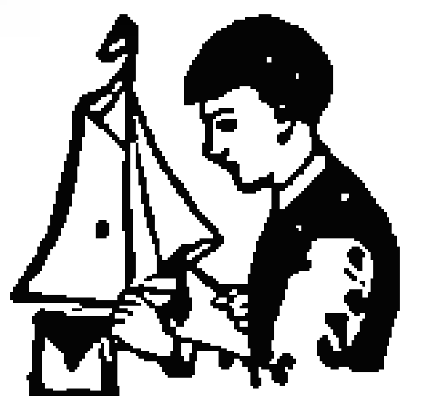

Greatest boys' book written. Tells how to make a Pinhole Camera, a Canoe, model Railroad, a Telephone, Boomerang, Telegraph Instrument, Box Kite, Talking Machine, Microscope, Electric Motor, Electric Door Bell, Water Wheel, Paddle Raft, a pair of Skis, a Dog Sled, Bird House, Rabbit Yard, etc. 64 pages. 150 illustrations. **PRICE 10c.**

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5-MINUTE HARMONICA COURSE. A new easy self-teaching method. Teaches how to play, to use the tongue, tremolo, fully illustrated. **Price 15c postpaid.**

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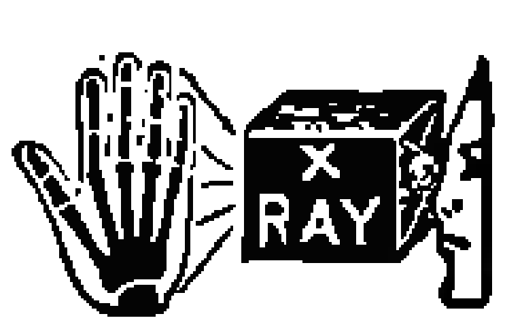
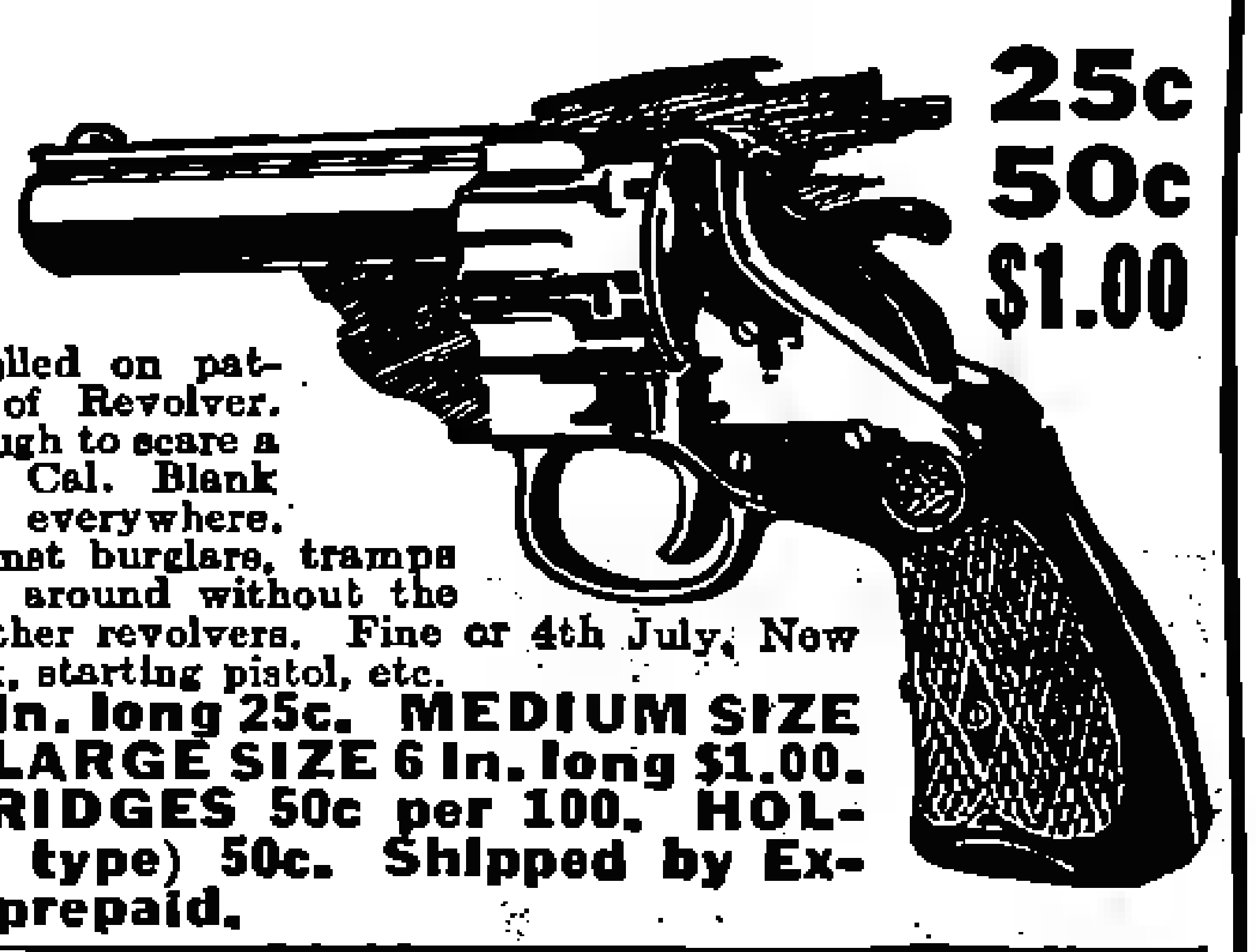


A wonderful little instrument producing optical illusions both surprising and startling. With it **you can see what [illegible] apparently the bones of your fingers, the lead in a lead pencil, the interior opening in a pipe stem, and many other** similar illusions. Price, **10c, 3 for 25c, p.pd.**

BLANK CARTRIDGE PISTOL

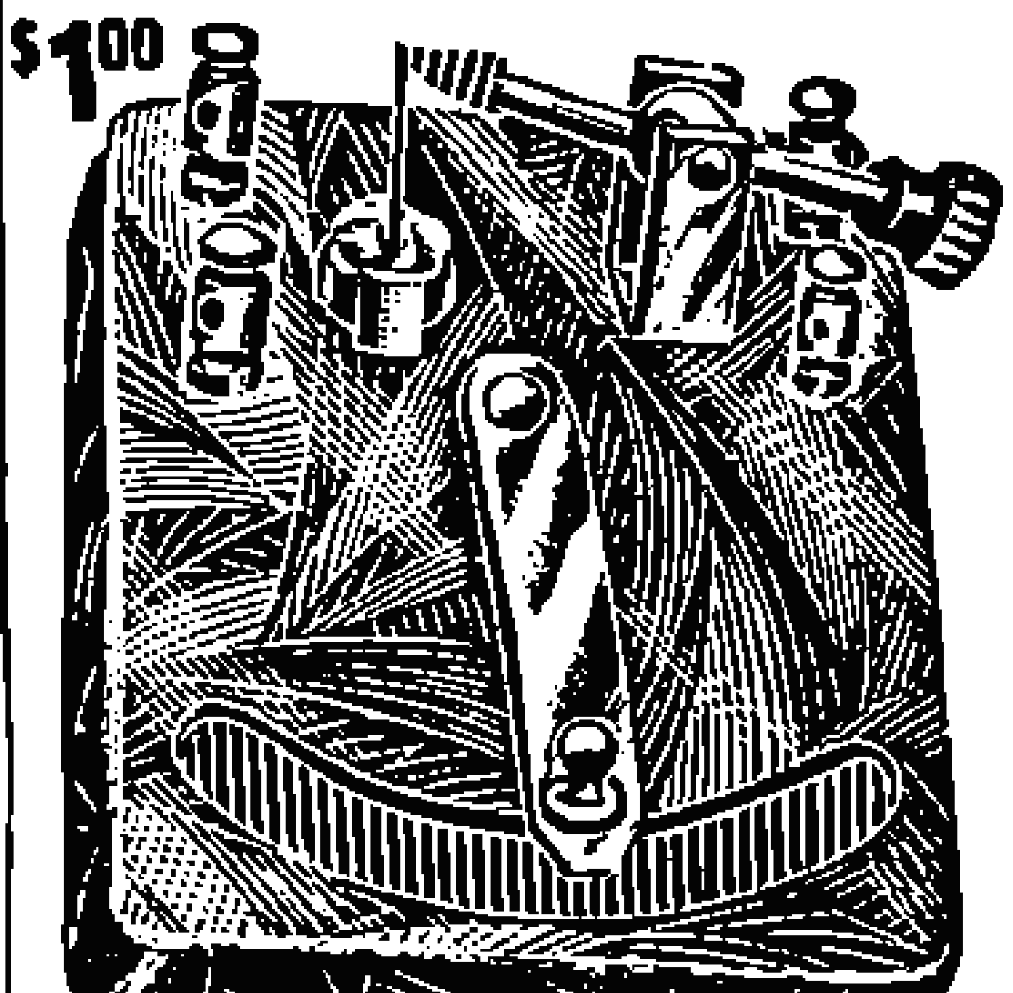
REVOLVER STYLE



25c 50c $1.00

Three new models now out, **25c, 50c and $1.00.** Well made and effective. Modelled on pattern of latest type of Revolver. Appearance alone enough to scare a burglar. Takes 22 Cal. Blank Cartridges obtainable everywhere. Great protection against burglars, tramps dogs. Have it lying around without the danger attached to other revolvers. Fine or 4th July, New Year's, for stage work, starting pistol, etc. **SMALL SIZE 4 in. long 25c. MEDIUM SIZE [illegible] in. long 50c. LARGE SIZE 6 in. long $1.00. BLANK CARTRIDGES 50c per 100. HOLSTER (Cowboy type) 50c. Shipped by Express only not prepaid.**

CRYSTAL RADIO SET $1.00



Say what you will about Electrical and Battery Sets, a CRYSTAL set has them all beat for simplicity and clearness of tone. There is absolutely no noise and no distortion—no batteries to buy—no tubes to wear out—no maintenance expense whatsoever. Cost nothing to operate and will last indefinitely. Reception is loud and clear. This Receiver is guaranteed to work equal to the most expensive Crystal Set you can buy. Has a receiving radius of over 25 miles, or under favorable conditions up to 100 miles. Constructed of the finest materials throughout, including supersensitive crystal, assuring quick results. PRICE of Receiver only **$1.00 postpaid.** Or complete with Ear Phone and Aerial Kit—everything all complete—nothing more to buy. **$2.95 postpaid. JOHNSON SMITH & CO., Dept. 719, RACINE, WIS.**

CHAMELEONS—25c

LIVE, SAFE DELIVERY GUARANTEED

Watch it change its color!

Get one of these most wonderful of all creatures. Watch it change its color. Study its habits. Wear one on the lapel of your coat as a curiosity. Watch it shoot out its tongue as it catches flies and insects for food. No trouble to keep. Can go for months without food. Measures about 4 inches in length. Shipped to any address in U. S. A. by mail. We guarantee safe arrival and live delivery. PRICE 25 CENTS POSTPAID.

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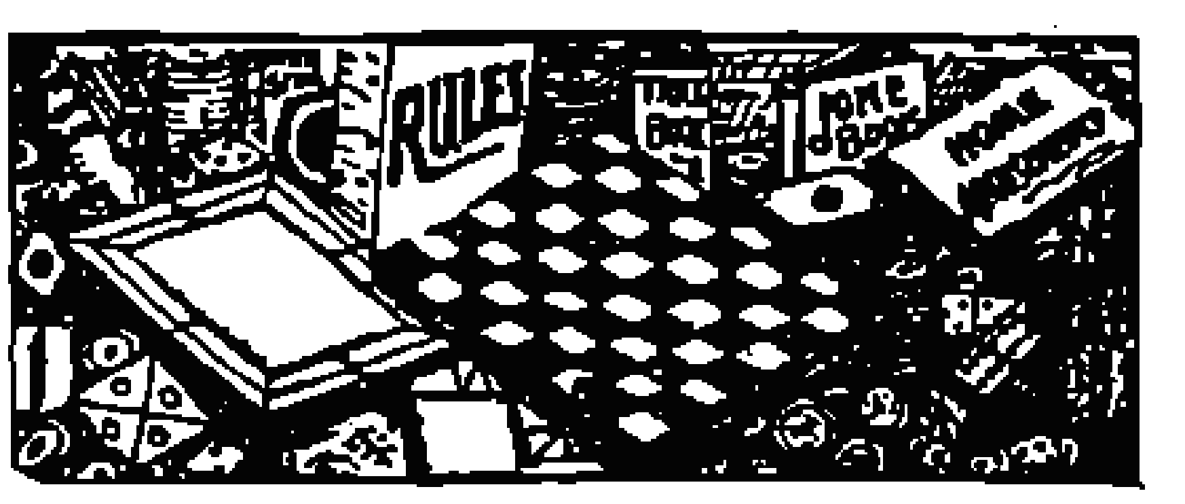

326 Jokes and Riddles, 25 Magic Tricks, 10 Parlor Games, 73 Toasts, 13 Fairy Tales, 105 Money-making Secrets, 22 Monologues, 21 Puzzles and Problems, 5 Comic Recitations, 10 Funny Readings, 11 Parlor Pastimes, 13 Flirtations, 1110 Girls' and Boys' Names and their Meanings, 10 Picture Puzzles, 69 Amusing Rhymes, 37 Amusing Experiments, Deaf and Dumb Alphabet, Shadowgraphy, Gypsy Fortune Teller, How to Tell Fortunes with Cards, Dice, Dominoes, Crystal, Coffee Cup, etc. Hypnotism, Ventriloquism, Cut-outs for Checkers and Chess, Dominoes, Fox and Geese, 9 Men Morris, Spanish Prison Puzzle, Game of Anagrams, 25 Card Tricks, Crystal Gazing, etc. ALL FOR 15c.

6-Shot Repeating Pistol

SHOOTS RUBBER BANDS

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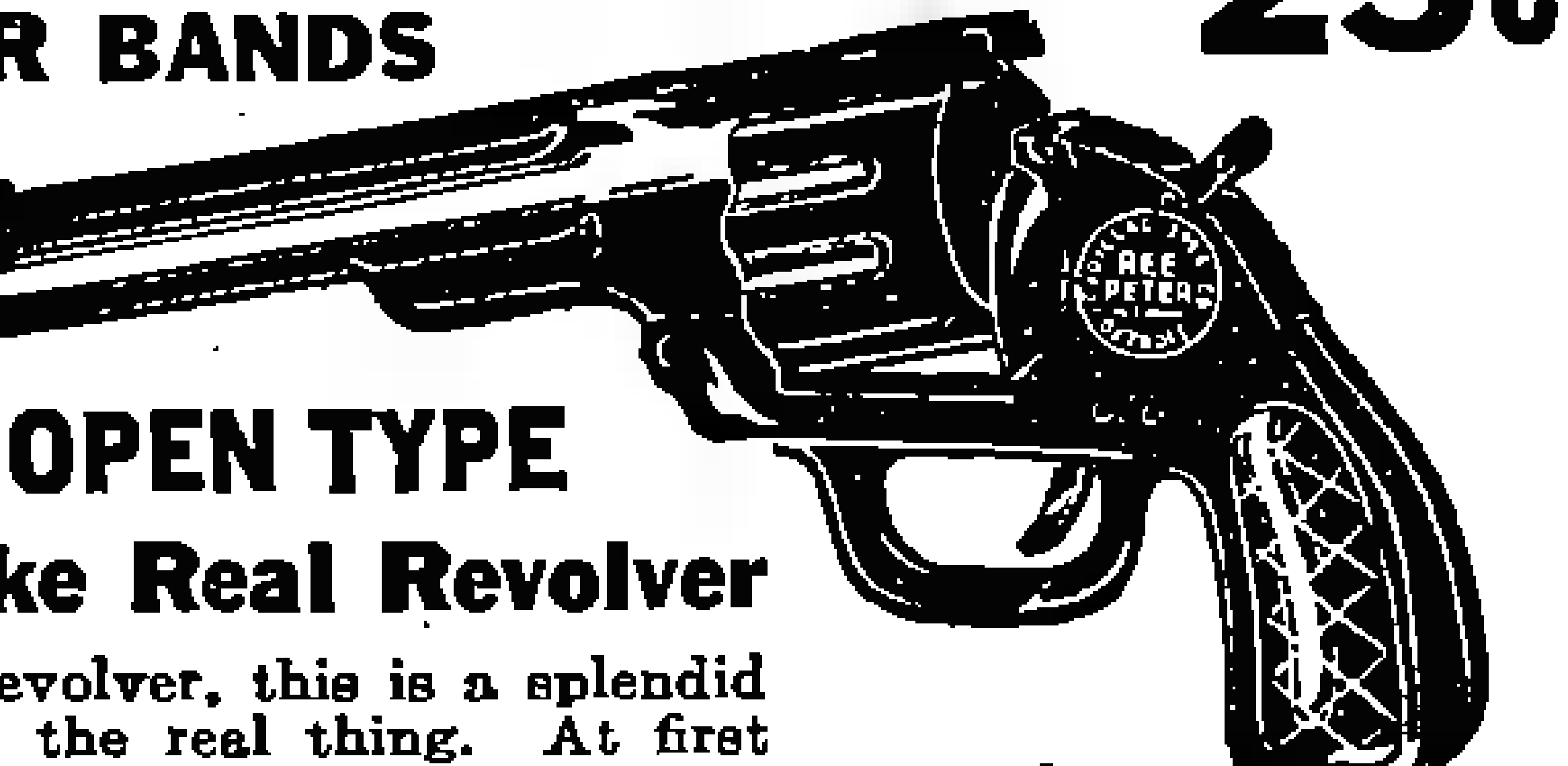

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Just Like Real Revolver

For a toy revolver, this is a splendid imitation of the real thing. At first glance it might easily be taken for a regular revolver. It is a FULL SIZE WEAPON, well made, with blue steel baked enamel finish. It fires from 6 to 8 rubber bands in rapid succession, as fast as you can pull the trigger. It breaks open in the middle just like an expensive revolver. Measures 8 inches long, with 3-inch barrel. Strongly made of 20 gauge steel. Looks exactly like a real gun and clicks like one when fired. A supply of rubber bands given with each gun. Packed in individual carton complete with directions. PRICE 25 CENTS BY MAIL POSTPAID.

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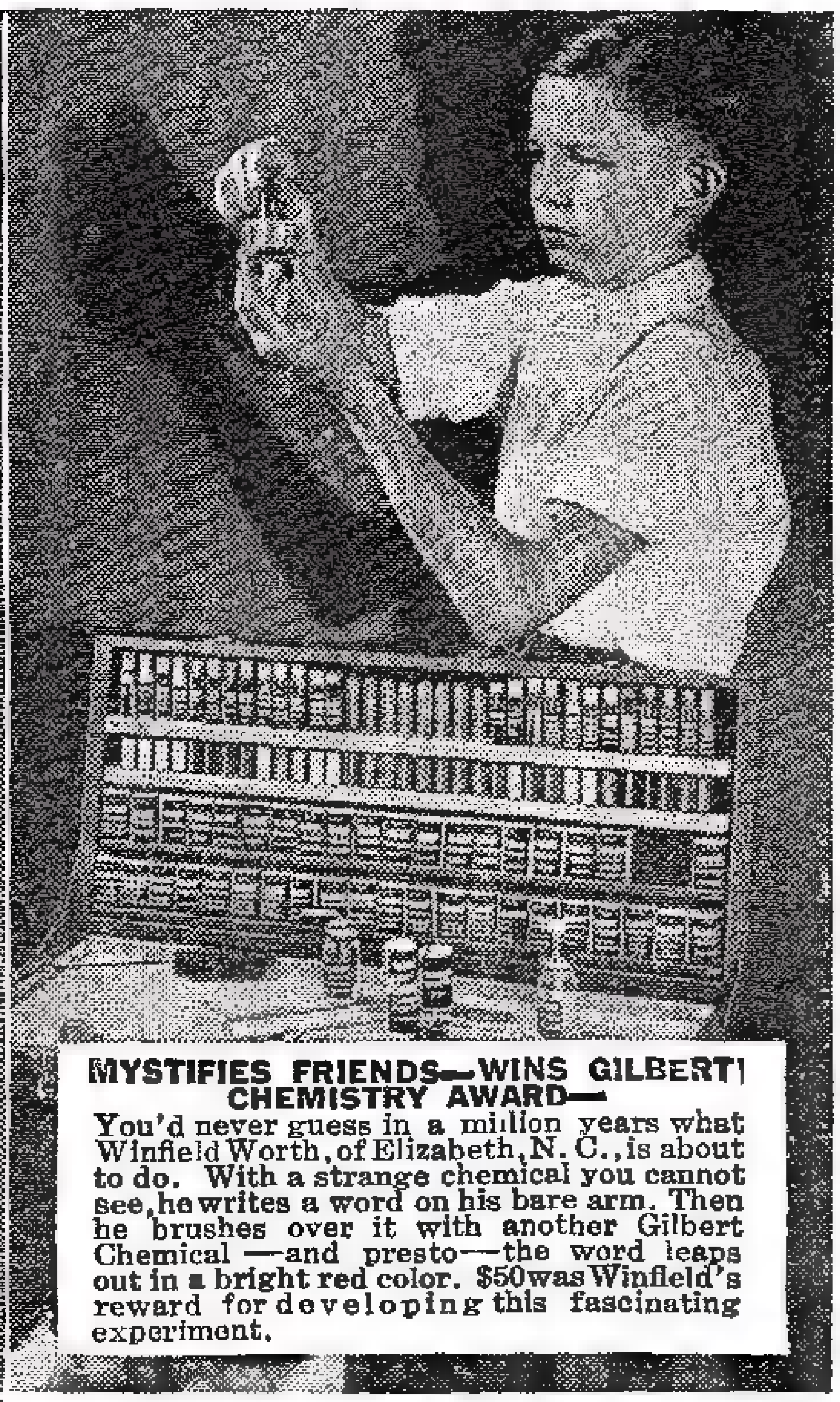
SEE HIDDEN SCIENTIFIC WONDERS WITH THE NEW GILBERT MICROSCOPE — Imagine seeing a fly's foot so that it looks as large as a cat's paw—salt crystals so big they appear like lumps of ice—and thousands of other wonders of Nature and science. The powerful Gilbert Microscope makes Chemistry more thrilling than ever. Packed with Gilbert Micro Chemistry Sets No. 4 and No. 7 or it can be purchased separately.



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GILBERT INVENTOR'S LABORATORY OUTFIT—Picture yourself in front of this marvelous Laboratory Outfit. Dazzling rows of chemicals mounted in real laboratory-style racks. Test tubes, mortar and pestle and other fascinating equipment. A big metal work tray. Large kit box, with detachable legs, that becomes a permanent laboratory. Complete with three exciting books—**Chemistry, Chemical Magic and Glass Blowing, $10.95.** Other Gilbert Outfits from $1. Larger sets contain additional books on **Mineralogy and Hydraulic and Pneumatic Engineering.**

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GILBERT CHEMISTRY OUTFIT

WOULDN'T you like to perform thrilling experiments such as Winfield Scott and thousands of other boys are doing? Have a chemical laboratory of your own! Make chemicals change color—transform liquids into sparkling crystals—and explore countless other mysteries of the chemical world. You might win one of the cash awards Mr. Gilbert gives each year to the boys making the most important contribution to chemical research. Ask to see the 1935 model Gilbert Chemistry Outfits at your local dealers. But —take a tip from other boy chemists—and make sure the name "Gilbert" is on the box.

$100.00

ANNUAL AWARD and twelve awards of $10.00 each

"To the boy doing what, in my opinion, is the most important chemical research in 1935, I will make a cash award of $100.00. To the twelve boys doing the most important chemical research I will award $10.00 each. Applicants for these awards must not be over 17 years of age, and must send me a full description of their experiments by June 1st, 1935."

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Fill out this coupon and mail it today for free copy of Mr. Gilbert's book "How to Become a Chemist" illustrating and describing each Gilbert Chemistry Outfit. Also free copy of the thrilling new magazine "Home Chemistry."

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Please send—free—illustrated book "How to Become a Chemist" and copy of "Home Chemistry."

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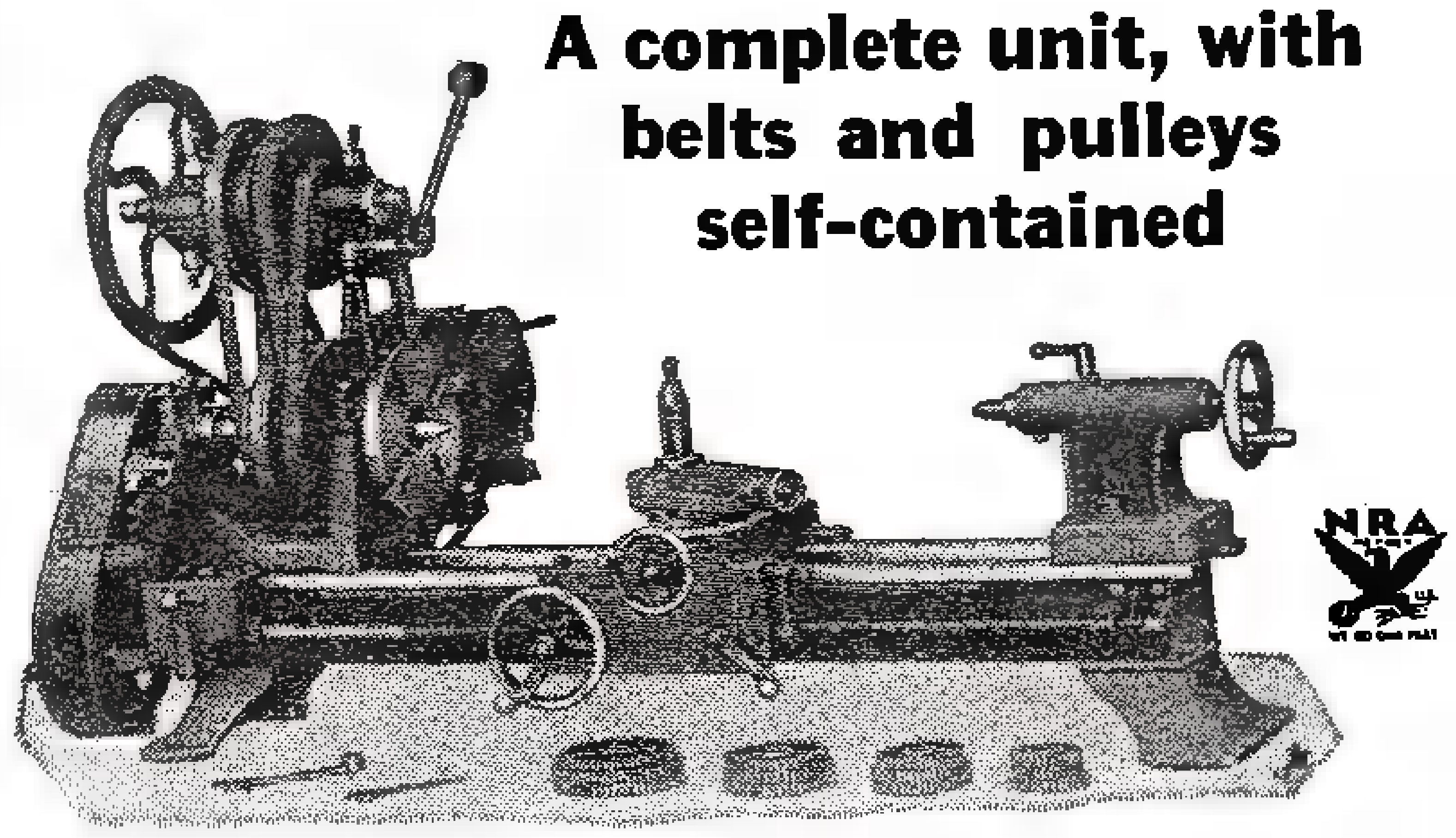
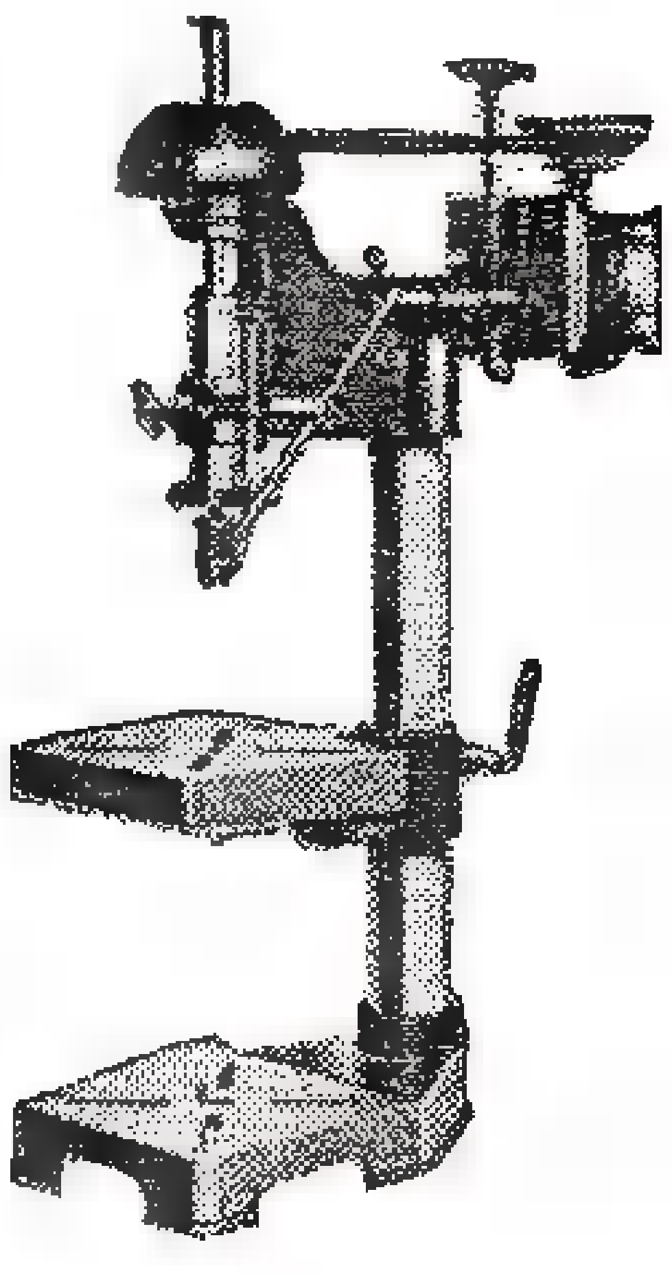
ATLAS 9" Metal-Working Lathe Accurate to 0.001" . . $79.

A complete unit, with belts and pulleys self-contained



NEW ATLAS DRILL PRESSES

Built in four sizes, for all classes of work. Bench and Floor Models. More and bigger bearings. Special Atlas construction prevents side play in quill. Speeds up to 5200 R.P.M. Precision tools — Priced from $13.95 to $33.45.



You buy a complete unit, ready to run, with self-contained countershaft and all belts.

Standard equipment includes automatic reversible feed; hollow headstock spindle; complete set of gears to cut from 4 to 72 threads per inch; thread cutting dial; compound rest graduated to 180°; six speeds with patented compound device, doing away with complicated back gears; Vee-belt drive—more pulling power.

Forty-five parts of Zamak Metal which has twice the strength of cast iron but is much lighter, thus doing away with useless weight. Lathe bed of heavily ribbed cast iron accurately machined and ground on very latest type of machine shop precision equipment—tested before shipment to .001" accuracy—9" swing—18" to 36" between centers. Immediate shipment. 10 days' trial with money back guarantee. Full line of tools and attachments at lowest prices. Send for free illustrated catalog. Be sure you know about the *Atlas Fully Equipped Lathe* before you order. Real metal working Lathes as low as $40. Write for information.

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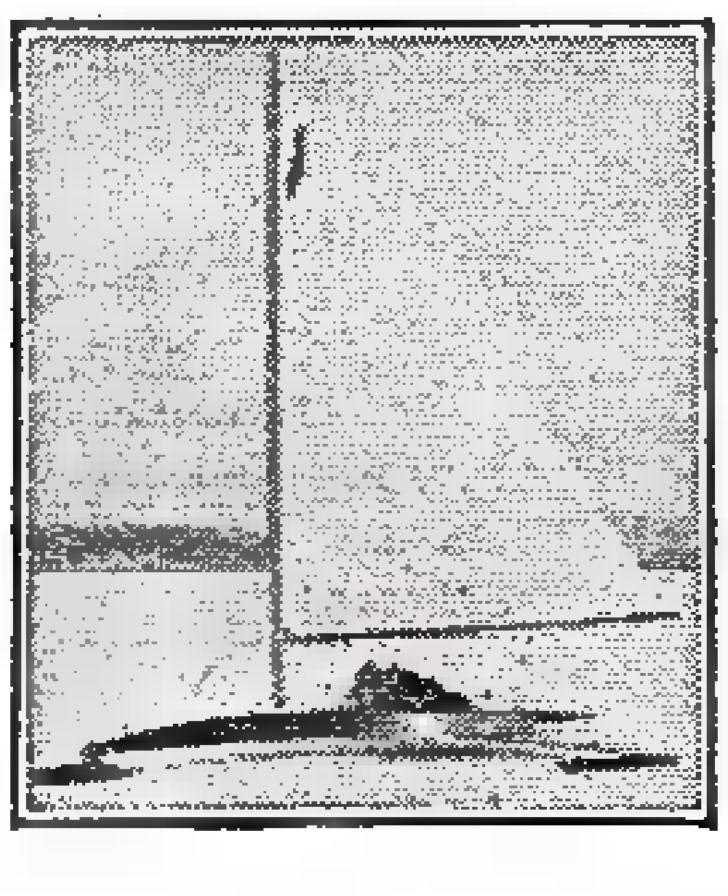

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MEAD GLIDERS
Dept. 12-M 12 S. Market St. Chicago

Build This Front-Steering Iceboat

(Continued from page 101)

wide at the front and 2½' at the back. The center of the cockpit flooring is aligned with the center-line of the backbone, being set with the rear edge 10" ahead of the end of the backbone, and then fastened in place.

Half-inch spruce is used for the cockpit rail. The space between the crossbeam and the plywood may be closed if desired.

Now you are ready to secure runnerplank to backbone. Set the center of the runnerplank 15" ahead of the extreme rear end of the backbone, and fasten in place with two 6" carriage bolts, 3/8" thick. At each end of the runnerplank is a hobbler, the attachment for the runner. For the most up to date hobblers, use four pieces of angle iron 10" long, each with two and three inch sides. There should be just enough clearance between each angle iron for the runner to pivot freely. Before permanently tightening the bolts, be sure the hobblers are absolutely parallel to the runner chocks.

Angle Irons Used for Runner Blades

Angle-iron affords the most inexpensive blades. Ten feet of ¼" stock with one inch sides will be needed. After being cut, the front ends should be heated and bent to fit the curves of the runner chocks. Quarter inch holes should be drilled every 6" on each side of the angle for flat head screws.

The rudder post is made with a ¾" steel rod welded into the back of 1⅜" channel iron. A cross-piece for steering is also welded to the rudder post. The crosspiece is connected to a similar one welded to the bottom of the tiller post with reversed, or crossed, ¼" aeroplane cables. The hole for the tiller post is drilled 9" from the stern, or rear end.

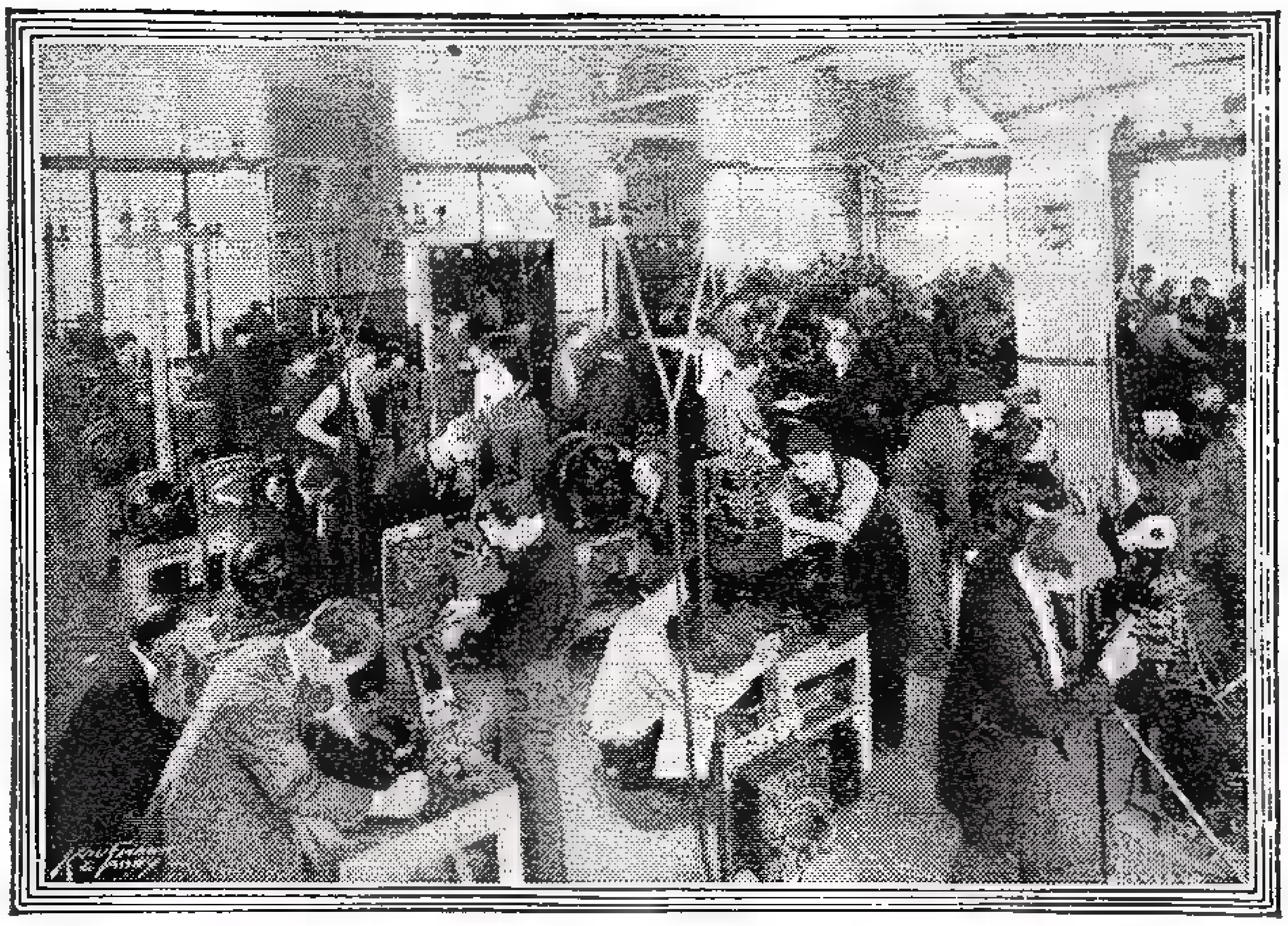
The hull is braced with stays of aeroplane cable 3/16" in diameter shackled to eyebolts through the runnerplank and to a strap iron nose bracket. The eye-splices in the stays should be secured with copper wire wrapping, which is smoothed over with solder.

The mast may be ovalled by rounding off the corners. It is braced with three stays of aeroplane cable looped around the mast 6 feet from the top. These loops should be secured by tightly wrapping copper wire for six inches.

Four small single-sheaved pulleys will be needed to handle the mainsail conveniently. Run the sail rope forward overhead along the boom to a pulley affixed under the jaw, then to another on the backbone.

WORK FROM BLUEPRINTS!

For the convenience of those builders who prefer to work from enlarged plans, blue-line prints of the Front-Steering Iceboat have been made up to sell for $1 postpaid. Each sketch in this article has been enlarged many times on tough white paper. Send your order to Modern Mechanix Publishing Co., 529 S. 7th St., Minneapolis, Minn.



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NO RED TAPE—NO STRINGS TO MY OFFER—YOU RUN NO RISK! I'LL TRAIN YOU IN MY SHOPS FOR 90 DAYS—YOU GET OVER ONE YEAR TO PAY TUITION AFTER GRADUATION! Make your first payment 60 days after your 12 weeks' Training period and then take over a year to pay the balance in small monthly payments. Your earnings on the job as a Coyne Trained Graduate should make it easy. **I'm willing to back you** in this way because hundreds of my successful graduates have proved to me that the fellow who wants to improve himself and his conditions is the finest credit risk in the world.

Learn By Doing In 12 Weeks In the Chicago Coyne Shops

Do actual work on Electrical Equipment worth many thousands of dollars **to qualify yourself for a big pay job.** Learn to wind armatures, be an illumination expert, do signal engineering, be a power plant or substation operator, or prepare for other big-pay electrical jobs. All under individual instruction and on the sort of work you will meet out in the field on a real job.

All Actual Shop Work on Motors, Generators, etc.

The remarkable "Learn By Doing" method used in the great Coyne Shops trains you to master Electricity and its many branches **in 12 weeks.** Actual shop work—**not a correspondence course**—you don't have to recite. Instead you do actual work in wonderful, modern daylight shops on the finest kind of Electrical equipment, under personal supervision of expert instructors. That's why Coyne Training prepares you as a real Electrical Expert in such a short time.

You Don't Need Advanced Education or Previous Experience

If you understand simple English you can train the Coyne way—by actual work on up-to-date generators, motors, dynamos, batteries, automotive and aviation engines, electric signs, etc. Do **actual jobs** you will be called on to do in the field. When you finish **Coyne Training** you should be able to confidently tackle any job, for you will have actually had similar work during your training.

Earn Living Expenses While You're Training

Many of my students work part time to help pay their living expenses while they are training. My employment Department will also assist you to find a spare time job to cover a good part of your room and board expenses. If you need part time work write me about your problems.

Employment Help for You After Graduation

My Graduate Employment Service will give you real employment help. As one of my graduates you will get assistance quickly, and every help we can give you to locate a job for which you have been trained. In addition to **employment help you get consultation service** free for life. Your **life scholarship** entitles you to come back to Coyne at any time and take up any new subject added to our course.

Get This FREE BOOK

Big Pay
OPPORTUNITY
in
RADIO

Get the new **"Coyne Opportunity Book,"** giving all facts about Coyne Training. Photographs of Shops showing students at work on modern electric equipment under the personal supervision of Coyne Expert Instructors. Also **details of my Spare Time Employment Offer, Pay After Graduation Plan** and **Graduate Employment Service.** Yours without cost. **Simply Mail the coupon.**

Electric Refrigeration, Air Conditioning Included Without Extra Cost

The fastest growing industries in America today. Manufacturers and Distributors of Refrigeration and Air Conditioning equipment need **Trained men** who **have Specialized** in these rapidly expanding fields. Here at Coyne you will prepare to fill a job as Installation and Service man, Shop Mechanic, Tester, Assembler, Inspector, etc. You will learn about various types of compressors, condensers, temperature control devices, thermostatic and expansion valves—**you will do actual work** on latest types of Refrigerating and Air Conditioning machines. And, it won't cost you one extra cent to get this remarkable training. I include it absolutely Free with your regular Electrical Training.

Mail Coupon NOW!

H. C. Lewis, Pres. **Founded 1899**
COYNE ELECTRICAL SCHOOL
500 S. Paulina St. **Dept. 94-53** **Chicago, Ill.**

H. C. LEWIS, President
Coyne Electrical School, Dept. 94-53
500 S. Paulina St., Chicago, Ill.

Send me your big FREE Book about Coyne Training and give me all details regarding your "Spare Time Employment Offer" and "Pay After Graduation Plan" of easy, monthly payments.

NAME______________________________

ADDRESS___________________________

CITY________________STATE________

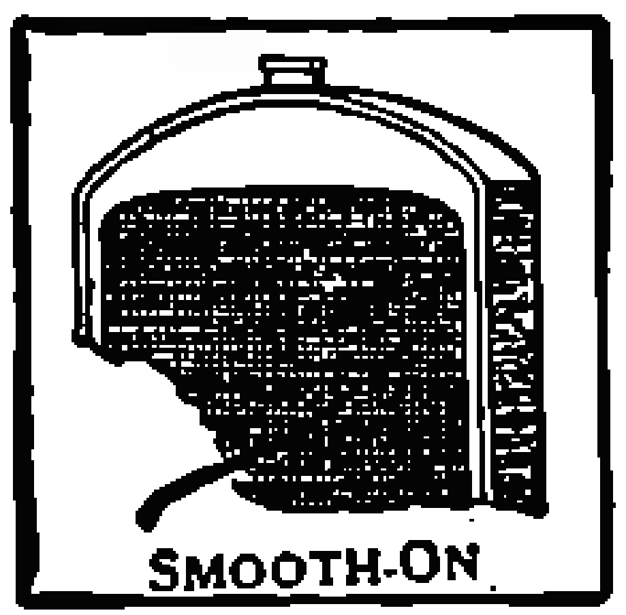
STOPPING LEAKS
WHERE THE METAL IS THIN

THIS is the easiest kind of a Smooth-On repair to make and anyone can get good results.

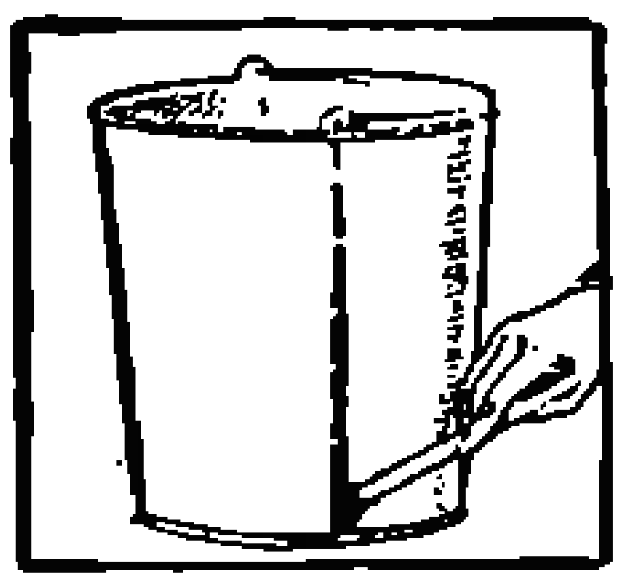
Merely mix the Smooth-On with water until it forms a putty. If the leak is at a seam, pry open a little, clean off, and force the Smooth-On in with the finger or a knife blade. At a rusted spot, scrape off the rust, force the Smooth-On through and press it to anchor on both sides. At small holes, put the Smooth-On between washers inside and out and use a small machine screw and nut for drawing up tight.

Smooth-On No. 1 forced into seam openings, between rivets, or into the holes quickly metallizes and thereafter is tight against hot or cold water, steam, smoke, oil, gasoline, gas, etc. It holds in any metal and can be used as well to stop leaks at joints and cracks in cast or wrought metal pipes, radiators, boilers, and furnaces. Use it also to tighten loose handles and to anchor loose bolts, screws, etc., in metal, concrete, tile and wood.

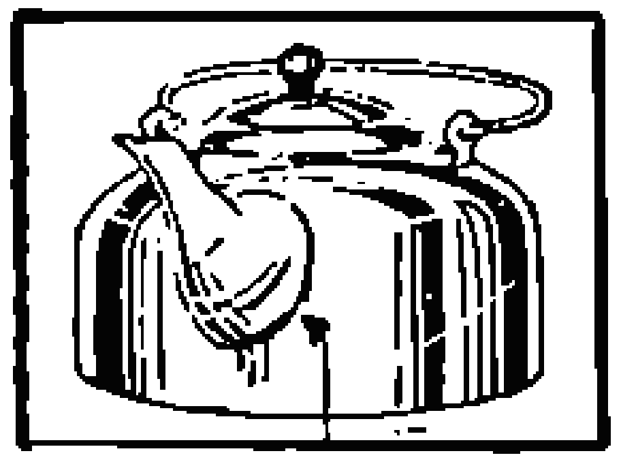
By following the simple directions in the Smooth-On Repair Booklet, you can make dozens of home and automobile repairs at a very small fraction of what a repair man would charge, and if you keep a small can of Smooth-On ready for emergencies, you also avoid annoying delays.



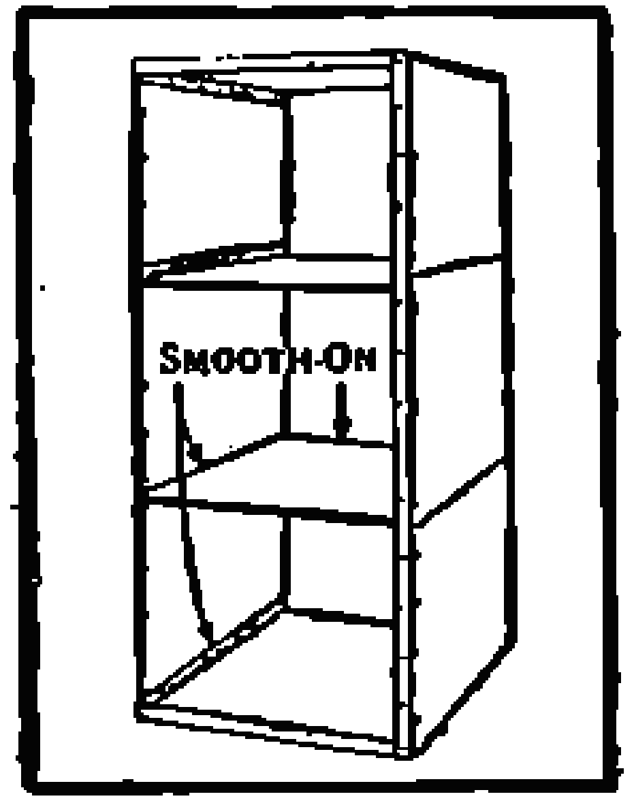
Radiator



Leaky Pail

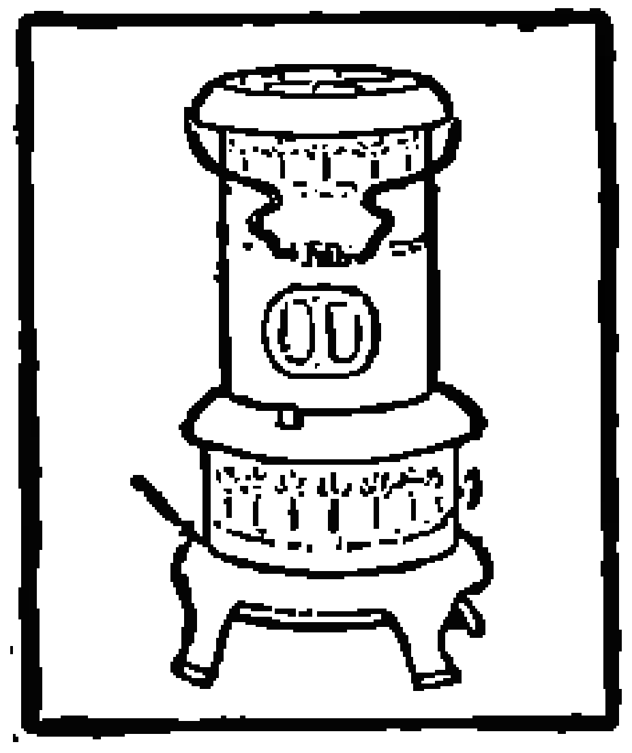


Leaky Kettle

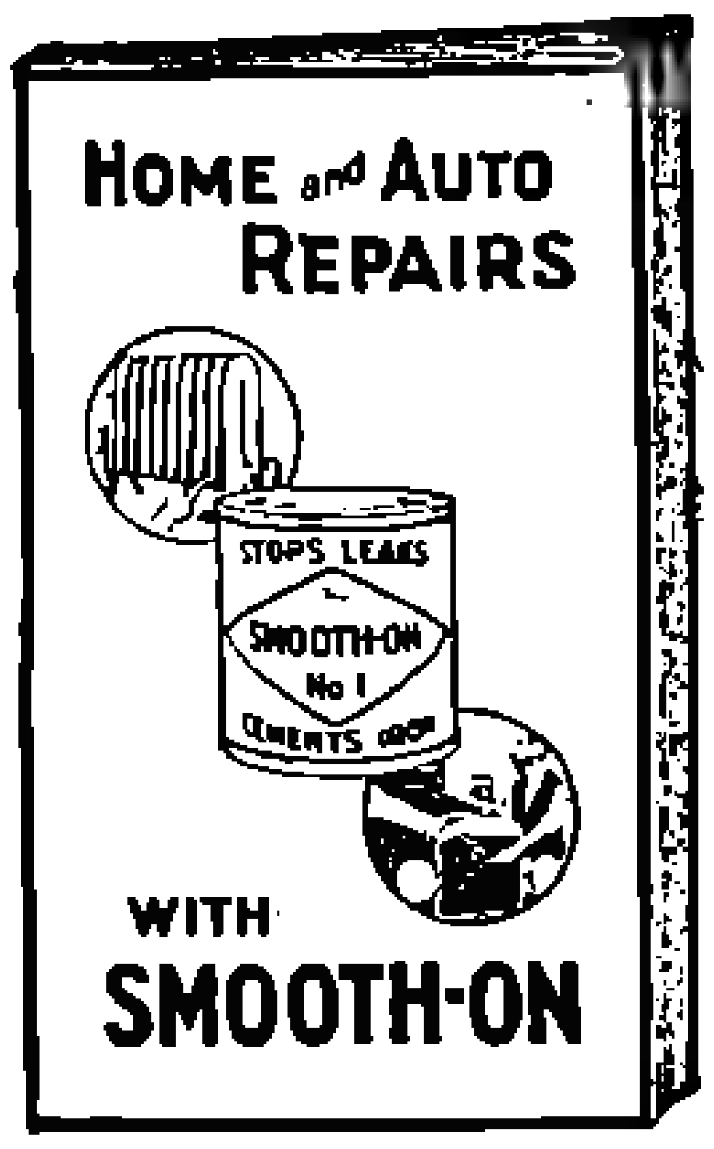


Leaky Tank

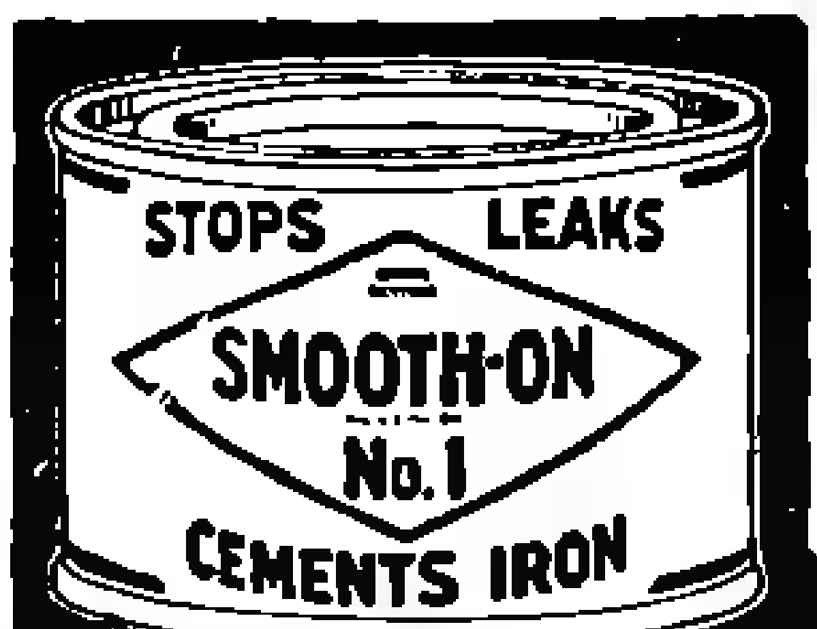
Stove Pipe



Oil Leaks



Write for
FREE BOOK



Get Smooth-On No. 1 in 7-oz., 1-lb. or 5-lb. tins at any hardware store or if necessary direct from us.

Do it with SMOOTH-ON

SMOOTH-ON MFG. CO., Dept. 69
574 Communipaw Ave., Jersey City, N. J.

Please send the free Smooth-On Repair Book.

Name ....

Address ....

12-34 ....

Enjoy Football With This Game

(Continued from page 120)

It is now first down and ten yards to go. The point of the ball is placed on the proper line, and the downs marker set to mark off ten yards in the direction of the opponents' goal. The player with the ball then calls his plays and throws the dice.

Should the offensive player select a Line Buck or End Run, the numerals on the chart indicate yardage gained; numerals followed by L show yardage lost; F-R is a fumble which is recovered for no gain, it then being next down; F is a fumble which gives the opponent the ball at the point where play began; and P-5 is a penalty of 5 yards.

If a Lateral, Short, Medium, or Long Pass is called, C indicates it is completed for the yardage specified. Yardage is placed after the symbol N indicating an incompleted pass to show whether there is a touchdown on that play which will bring the ball out to the 20 yard line. Apply official football rules here for touchbacks or incompleted passes, and for all other plays.

I indicates an intercepted pass, the ball going to the opponents at the point from which it started if it is a lateral pass. The yardage indicated with I on other passes is to be taken as gain made up to the point where the pass was intercepted. The dice are then thrown again, and the yardage which the pass was returned read off under Intercepted Pass and Kick Returns.

C-7-9 indicates the pass was complete, for a 7-yard gain, and the ball was then run for an additional 9-yard gain.

Yardage under punts is, of course, made with loss of the ball. Where D follows the yardage, the ball has been downed by a player on the kicking side, and cannot be returned; otherwise other player calls for a Fair Catch or Kick Return. BL-5L is taken as a blocked kick, there being a loss of 5 yards and ball going to opponents. BL-6G means a gain of 6 yards before kick was blocked and downed by opponents. BLTD is a blocked kick caught in the air by the opposing team and run back for a touchdown.

Try for point after touchdown is made from the two yard line.

Behind Scenes on Movie Battlefields

(Continued from page 120)

with sweat and black with charcoal; but a little soap and water quickly removed all traces of battle.

Every individual explosive is wired directly to a firing board. One set of contacts, for instance, connects with a distributing block connected with mines and shells within a particular area. I know, for instance, that the left-hand one-third of the 200 contacts on my own board lead to Block No. 1, in the distant left background. As the battle progresses I remember which have been fired. Usually I fire two explosions simultaneously, perhaps a tree on the left and a mine on the right. Thus I "frame" the picture continuously for the cameras.

Get THIS Body for $3.95!

Amazing New

Home Training Camp

Gets Remarkable Results

New kind of home gymnasium quickly builds smashing muscles and QUICK! tremendous all-around bodily strength. Rebuilds every muscle. Gives you new stamina, endurance, and never-failing energy. Read the 23 big features you get—more than ever before offered at this price by anyone, anywhere, at any time!

LOOK AT ALL YOU GET . . . 23 BIG FEATURES—

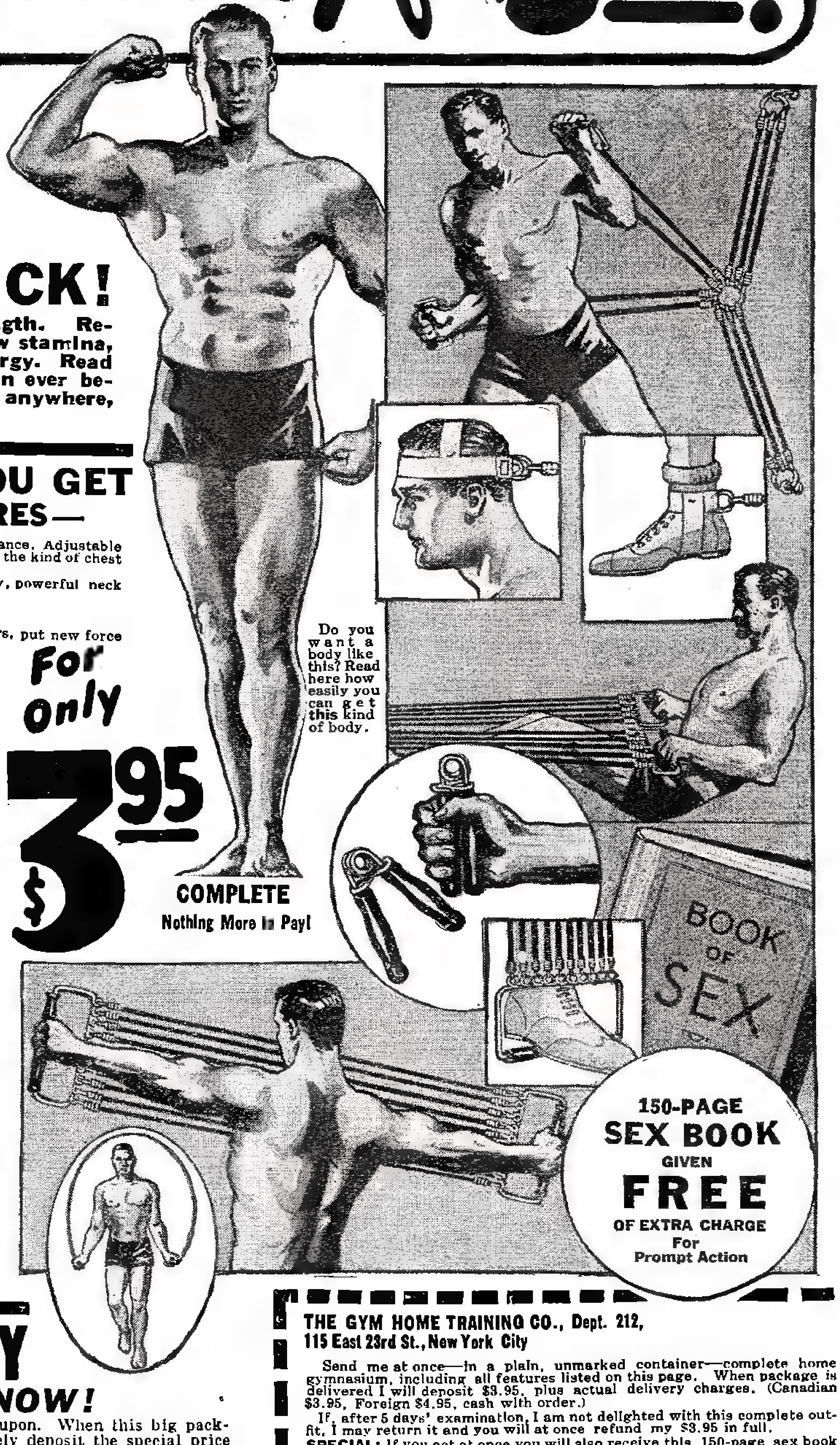
1. **—Chest Expander**—Ten Cables, 200 lbs. resistance. Adjustable to your particular needs. A quick way to build the kind of chest you have always longed to have.
2. **—Adjustable Headgear**—for building sturdy, powerful neck muscles.
3. **—Foot Gear**—for ankles and calves.
4. **—New Type Hand Grips**—Strengthen fingers, put new force into wrists, forearms.
5. **—Contestable Stirrup**—Puts new power into legs, muscles of stomach and thighs.
6. **—Rowing Machine Attachment**—gives you the back-building advantage of this great sport.
7. **—Complete Wall Exerciser, Attachments**—for general body development.
8. **—Muscle Clock** — Measures your muscle power. Shows what your muscle power is in pounds.
9. **—Foot-Gear and Ankle Strengthener**—to put new endurance into your ankles and to lift and strengthen your arches.
10. **—Special Skip Rope**—for increasing speed and developing your wind.
11. **—20 Famous Wrestling Holds**—clearly pictured and described.
12. **—15 Secrets of Jiu Jitsu**—making you the master of any man, regardless of his size.
13. **—17 Winning Boxing Positions**—clearly shown in pictures.
14. **—10 Feats of Strength**—tricks you can easily do which will amaze everyone.
15. **—Tricks of Hand Balancing**—some of the stunts which have astounded you on the stage.
16. **—Vital Food Facts**—scientific information told in a simple way. What to eat to create new power and vitality.
17. **—Special Ways to Get Bulging Biceps**—clear instruction for using this apparatus to rebuild that specific part.
18. **—Secrets of Chest Expansion.**
19. **—The Stomach Muscles and How to Strengthen Them**—special advice on this important zone of the body.
20. **—Ways to Put New Power Into Your Legs and Thighs**—many otherwise strong men are weak here.
21. **—Hints on Increasing the Strength of Your Back**—for greater lifting ability.
22. **—PRIVATE Letter To Men**—pointing dangers and safeguards you should know, for your own protection.
23. **—Complete 150-Page Sex Book**— simply and clearly written (and illustrated) by great doctor. Straight answers to questions that have puzzled you.

For Only $3.95

COMPLETE

Nothing More to Pay!

Do you want a body like this? Read here how easily you can get this kind of body.



150-PAGE SEX BOOK GIVEN FREE OF EXTRA CHARGE For Prompt Action

SEND NO MONEY

Mail Coupon NOW!

You don't have to send a penny with this coupon. When this big package is delivered—in its Plain Container—merely deposit the special price of $3.95 plus actual delivery charges. (This one low price includes ALL these 23 items—no further payments.)

Then if, after 5 days examination, you are convinced that this complete home gymnasium will not give you the kind of body you have always longed to have, will not improve your health, increase your strength, and make you a better and more confident specimen of physical manhood—if you are not positive that these claims are true, then you have the perfect right to send back all the material you have received and your $3.95 will be refunded in full at once.

Don't be satisfied with anything less than the kind of body you have always wanted! Don't "put off" doing something about it—now when it is so easy to rebuild yourself this new way! Mail coupon—without money—at once. THE GYM HOME TRAINING CO., Dept. 212, 115 E. 23rd St., New York City.

THE GYM HOME TRAINING CO., Dept. 212,
115 East 23rd St., New York City

Send me at once—in a plain, unmarked container—complete home gymnasium, including all features listed on this page. When package is delivered I will deposit $3.95, plus actual delivery charges. (Canadian $3.95, Foreign $4.95, cash with order.)

If, after 5 days' examination, I am not delighted with this complete outfit, I may return it and you will at once refund my $3.95 in full.

SPECIAL: If you act at once you will also receive this 150-page sex book ABSOLUTELY FREE!

Name ______________________

Address ______________________

City ______________ State ______________

☐ Check here if you are enclosing $3.95 right WITH this coupon. In that case, we will pay the delivery charges and you will make this saving.

HE'LL USE LEPAGE'S

"I MADE IT MYSELF"

● As he points with pride to his doghouse, his first effort in craftsmanship, he probably didn't use glue.

But he'll try other projects where he'll want snug joints, reinforce nails and screws, fill small cracks and nail holes. Then he'll discover that glue actually helps to make a workmanlike job.

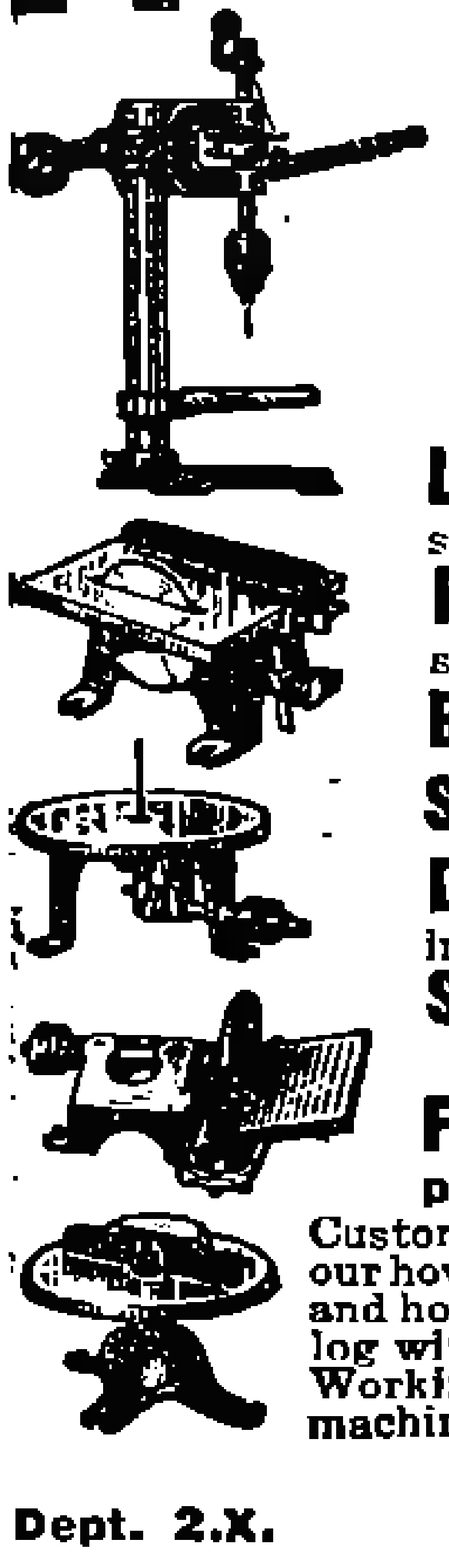
Will he bother with a glue pot, when LePage's is so easy to use right from the can? Would you, when the difference in cost is hardly worth mentioning? You can get it from your hardware dealer.

RUSSIA CEMENT COMPANY
Laboratories and Factory • Gloucester, Mass.

LEPAGE'S GLUE
LEPAGES
LIQUID GLUE
LEPAGES
strength
LIQUID GLUE

"AMERICAN JUNIOR" POWER TOOLS

$2.50 EACH



A sensational New Deal in Power Tools—
Now EVERYONE Can Have a Completely Equipped Shop for a few dollars. Mass production, big sales-volume and improved designs permit this amazing value. Not toys, but

MASSIVE GREY IRON CASTINGS AND STEEL —workable, sturdy, unconditionally *GUARANTEED* to do the work intended.

LATHE 6" swing, 12" c. to c., extra lengths 50c per ft.; centers 35c extra; other accessories include chucks, saw-table, face-plates, etc., a complete shop in itself.

DRILL PRESS 16½" high, 6½" swing, distance chuck to base 7", takes 9-32" drills; chucks 50c, swinging table 35c.

BENCH SAW adjustable for depth cut, takes 5" blades; rip-gauge furnished. 4" blade 50c, 5", 75c.

SABRE SAW does all scroll and band saw work better and faster, blades 15c.

DISC SANDER with table tilting 45 degrees up or down, used for finishing, jointing, grinding, buffing, etc., most useful all round finishing machine.

SPINDLE SHAPER takes 1' x 5-16" cutters, does all molding.

EACH MACHINE $2.50 COMPLETE

FREE "American Homecrafters Manual". 96-page Illustrated Instruction Book ($1) free with every purchase.

Customers also receive FREE the "AMERICAN HOMECRAFTER," our how-to-make-it periodical, a digest of the best construction stories and home workshop ideas in all the monthly magazines. Ask for catalog with complete description of our full line, including 6" Metal Working Lathe $8.75 and other tools. Send $1 deposit on any machines, balance plus express C. O. D. In U. S.

AMERICAN MACHINE & TOOL CO.
Dept. 2.X. 200 Broadway New York, N. Y.

Finding Way When Lost in Woods

(Continued from page 76)

frightened out of the woods, will make his way. The hunter must, of course, find ■ spot from which he will not shoot toward the woods where the drivers are, but to the side, thus off-setting any possible accident.

Hunting deer alone actually is the acme of sportsmanship. It calls for a degree of stealth and caution in hunting that is not duplicated elsewhere in the field. In still hunting one enters the woods alone and works them as cautiously as possible, aiming to surprise the deer. Move along with utter care, stirring no leaves and breaking no twigs.

In still-hunting the paramount rule to observe is to have the wind blowing toward you. Always remember that the deer has a keen sense of smell. Therefore it is wise to leave off smoking while you hunt.

Walk Against Wind When Trailing

Although the moose is not as plentiful as deer, it ranks near the top as ■ big game quarry.

The rutting season of the moose occurs during the month of September, or, to be more exact, starts around the middle of the month and lasts into the first part of October.

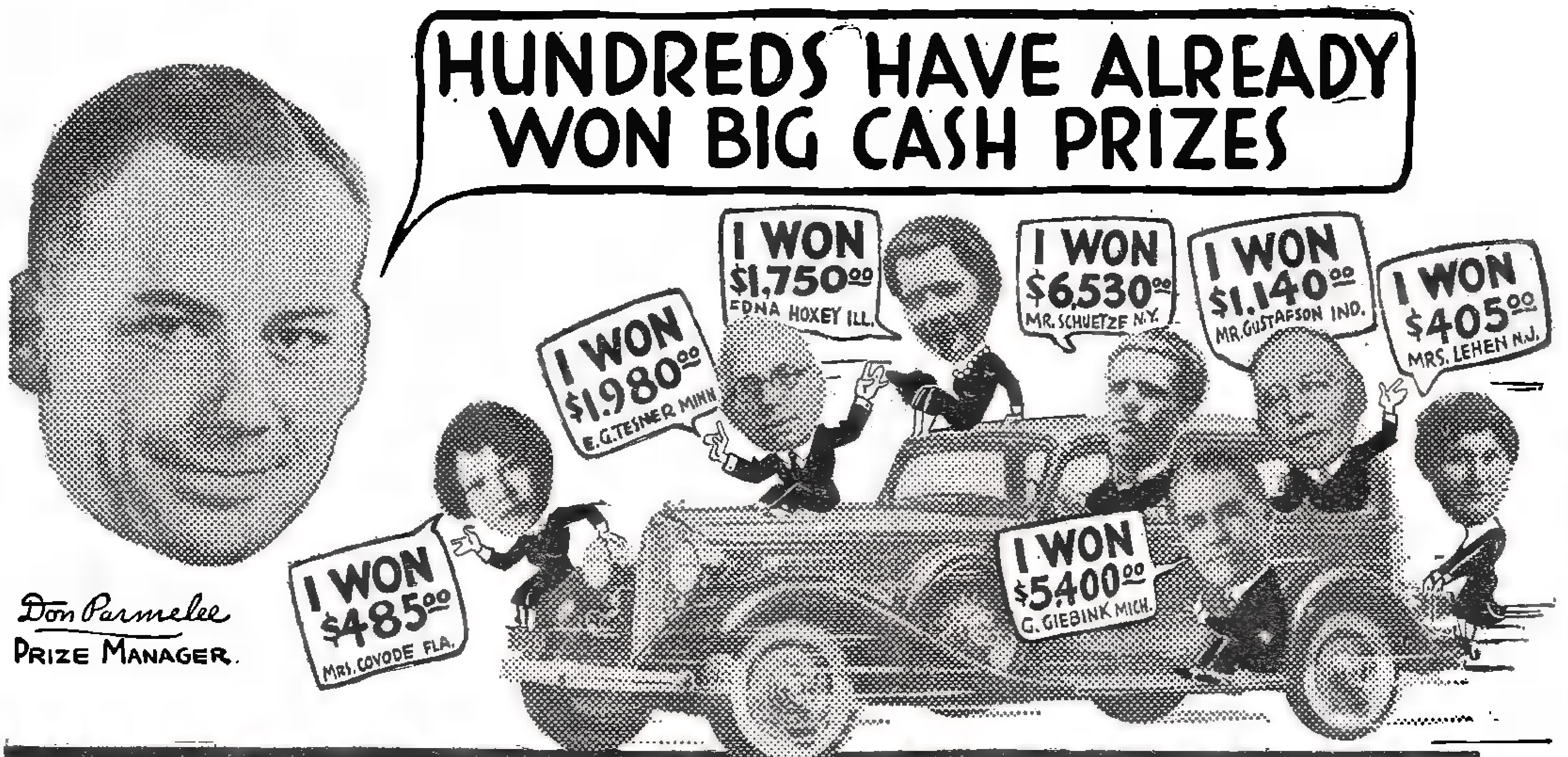
Still hunting the moose is at its best from the end of the rutting season in October to the close of the hunting season. If the woods are full of fallen leaves that crackle, the hunting is exceedingly difficult, a condition that is broken when rain soaks the leaves and a slight snow comes on. The hunting is conducted much on the order of still hunting the white-tailed deer, save that where a trail is located one can lay his plans to work out ahead of the moose by ■ short cut across the trail. To accomplish this successfully, one must keep the wind in his face, for should the animal catch the scent of the hunter the hunt is practically off.

Guns for Moose and Mountain Sheep

Many moose hunters use rifles that do not have sufficient smashing power. The .30-06 with a 180 grain open-point, expanding, lubaloy boat-tail bullet is one of the best rifles for moose hunting, considered by some as superior to the 7 mm. The .30-30 is too light for this shooting, with the .30-40 Krag somewhat better.

The hunter who is able to go out into the mountainous country of the northwest and bring back with him the majestic head of a ram is looked upon with envy by all hunters. It is an expensive sport, it is true, but the lure of colorful mountains and alpine meadows, seeking the mountain sheep around timberline, cannot be resisted.

Not only has the mountain sheep an exceedingly keen eyesight, but their sense of smell is equally as fine. The need for careful stalking, involving much climbing and sparring for position, cannot be overemphasized. It is generally conceded that the two best cartridges for this mountain work is the 7mm. and the .30-06, the .30-40 Krag being a good third suggestion.


HUNDREDS HAVE ALREADY WON BIG CASH PRIZES
I WON $485.00 MRS. COVODE FLA.
I WON $1,980.00 E.G. TESNER MINN.
I WON $1,750.00 EDNA HOXEY ILL.
I WON $6,530.00 MR. SCHUETZE N.Y.
I WON $1,140.00 MR. GUSTAFSON IND.
I WON $405.00 MRS. LEHEN N.J.
I WON $5400.00 G. GIEBINK MICH.

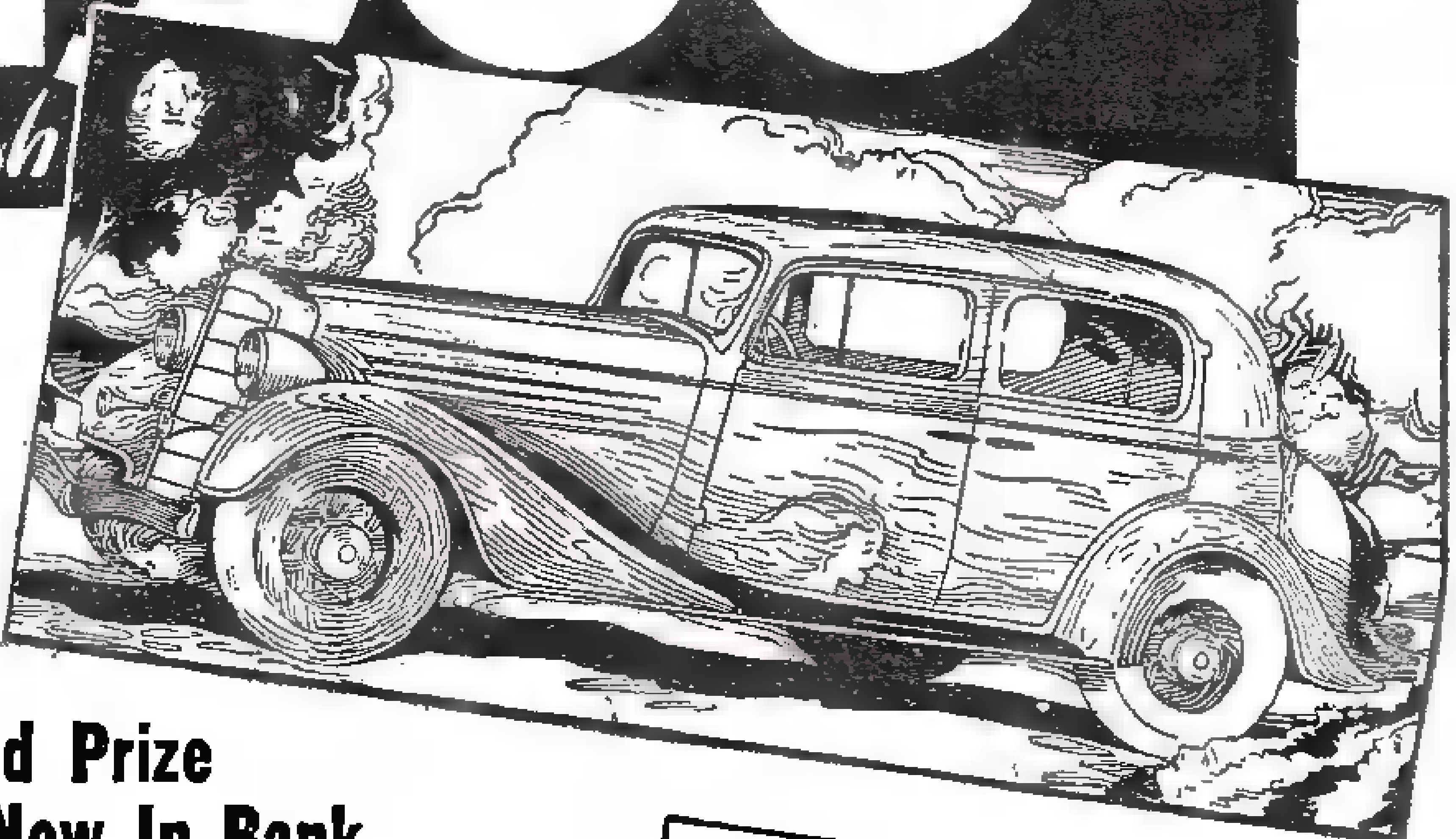
Don Parmelee
PRIZE MANAGER.

Now **HUNDREDS MORE** *Cash Prizes To Be Awarded!*

Would **YOU, TOO,** Like to

WIN $2,500.00

or BUICK and $1,000 *Cash*



A Sensational advertising campaign. Do you want $2,500.00? We want people acquainted with our company quick. We will award 100 Grand Prizes to advertise and extend our business. There will be thousands of dollars more in cash profit rewards. Would you, too, like to win a brand new latest model Buick 8 Sedan delivered by the nearest dealer and $1,000.00 extra for promptness (or $2,500.00 all cash if preferred)?

Maybe this grand opportunity sounds like a dream. Hundreds have already won big cash prizes in similar friendship campaigns conducted by men now in this company. Now comes your chance to go after big prizes.

Can You Find 5 Movie Star Faces in Picture?

The Stars who were riding got out of the car. See if you can find their faces about the auto. Look sharply. Some look straight at you, some are upside down. Can you find 5 or more? Not necessary to name them. Mark the pictures, clip and mail or just send coupon and I will tell you how you may win. In case of final ties duplicate prizes will be awarded. Get started quick by marking the Movie Stars you find.

Not a Penny of Your Own Money Needed

On Our Movie Star Plan

No indeed! By our plan you need not put in a penny of your own money to go after this $2,500.00 First Prize or one of the other Prizes. This is no lottery—no luck needed—no slogans to write—no subscriptions to buy or sell—no more puzzles. Someone will be the happy winner of $2,500.00. Will it be you?

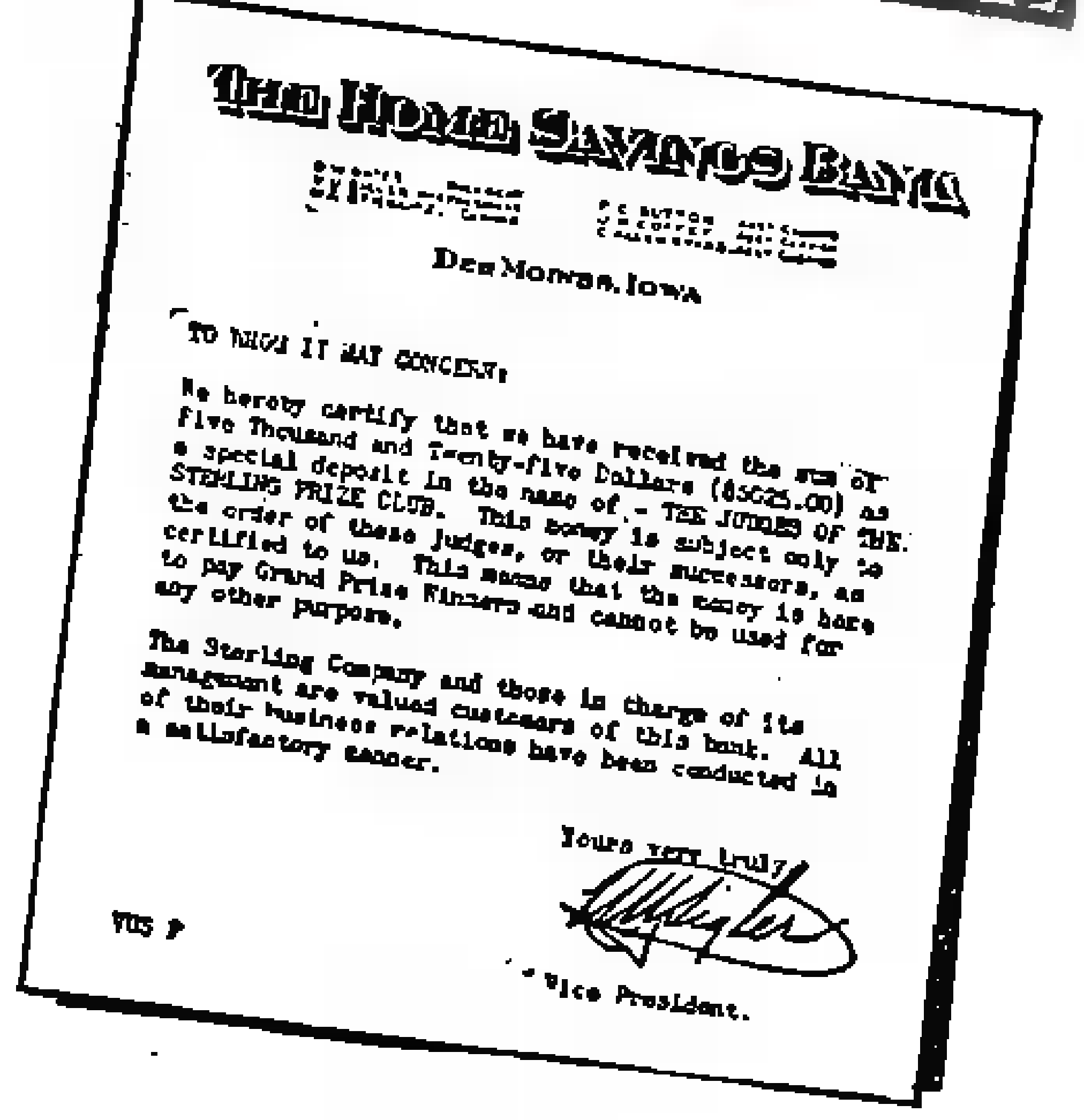
I promise you a cash profit reward if you take an active part in my campaign. Just think what it would mean if you should be the winner of $2,500. A new home. Travel. Education. Indeed this is more money than most people save in a lifetime. Mail coupon now.

$1,000 EXTRA CASH FOR PROMPTNESS
to First Prize Winner

I will award $1,000.00 extra to the first prize winner just for being prompt in following my sensational plan. Therefore first prize winner gets Buick Sedan and $1,000.00 if pronpt, or $2,500.00 all cash if preferred. Mail coupon today for details

All Grand Prize Money Now In Bank

More than $5,000.00 cash is now in the Bank for the Grand Prize winners. This cash can be used for no other purpose. The money must be used to pay the happy winners. I invite you to look us up through any credit agency, any bank in Des Moines, any big business house.



THE HOME SAVINGS BANK

DES MOINES, IOWA

TO WHOM IT MAY CONCERN:

We hereby certify that we have received the sum of Five Thousand and Twenty-five Dollars ($5025.00) as a special deposit in the name of - THE JUDGES OF THE STERLING PRIZE CLUB. This money is subject only to the order of these judges, or their successors, as certified to us. This means that the money is here to pay Grand Prize Winners and cannot be used for any other purpose.

The Sterling Company and those in charge of its management are valued customers of this bank. All of their business relations have been conducted in a satisfactory manner.

Yours very truly,

Vice President.

$10,000.00 REWARD

We will pay $10,000.00 to any worthy charity if anyone can prove we do not really award all these thousands of dollars in Grand Prizes—or if the money is not in the bank to pay the happy winners.

Send No Money

RUSH COUPON

The first thing to do is to **Send the Coupon Today.** Mark the Movie Stars, clip picture and mail. Don't send a penny. For replying I will tell you how you may share in this opportunity to win big cash prizes. Send the coupon now—before you miss this opportunity.

DON PARMELEE,
Prize Manager,
112 to 114 Eleventh St.,
Dept. 235 Des Moines, Ia.

DON PARMELEE, Prize Manager, Dept. 235
112-114 Eleventh St., Des Moines, Iowa.

I have marked the Movie Stars in picture which I am enclosing, and am anxious to win.

Name..

Address..

City.......................State...........

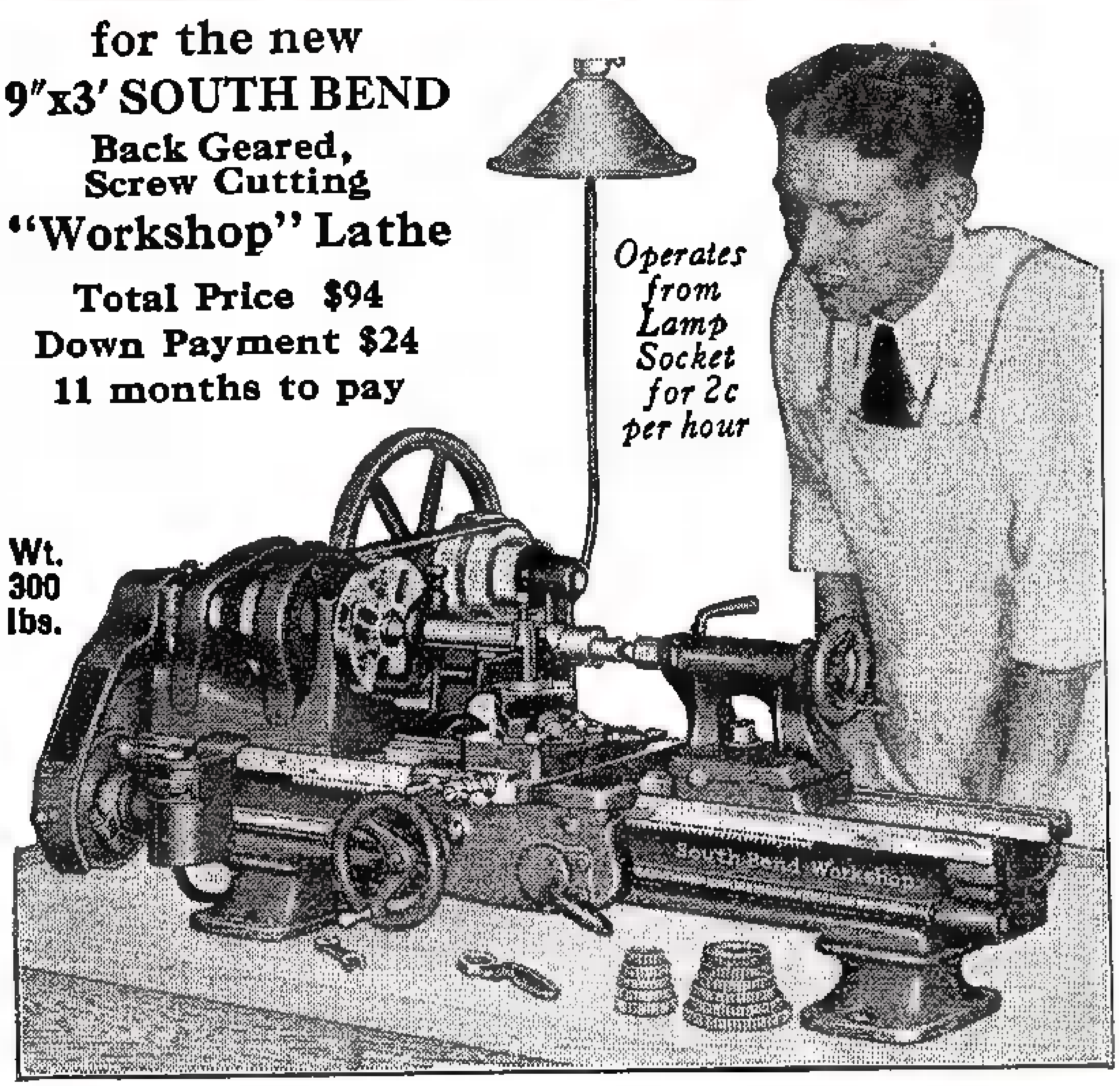
Mark in square which you would prefer if you should become First Prize winner.

☐ **BUICK AND $1,000** OR ☐ **$2,500 CASH**

NO CONNECTION WITH ANY OTHER FIRM OFFERING PRIZES

Only $7.00 a Month

for the new
9"x3' SOUTH BEND
Back Geared,
Screw Cutting
"Workshop" Lathe
Total Price $94
Down Payment $24
11 months to pay



9" x 3' "Workshop" Bench Lathe complete with reversing motor and reversing switch as shown...... $94

The 9-inch "Workshop" Lathe is a Metal Working Lathe and will handle all general machining operations. Can also be used for wood turning and machining compositions. Cuts screw threads, right and left-hand, 4 to 40 per inch. Hundreds of "Workshop" Lathes are now in use in machine shops, auto service shops, home shops, laboratories, electrical shops and manufacturing plants. Features include: Back-geared headstock; 6 spindle speeds; automatic power feed to carriage as fine as 350 per inch; reverse for threads and feeds; graduated compound rest. Price without Motor Drive. $75. Other bed lengths 3½' and 4'. Easy terms. 30 day trial. Immediate delivery. (An Ideal Christmas Gift).

Write for new 24-page Bulletin No. 5-W describing the "Workshop" Lathe and work it does. Mailed free, postpaid, to any address.

NRA SOUTH BEND LATHE WORKS
525 E. Madison St. South Bend, Ind.

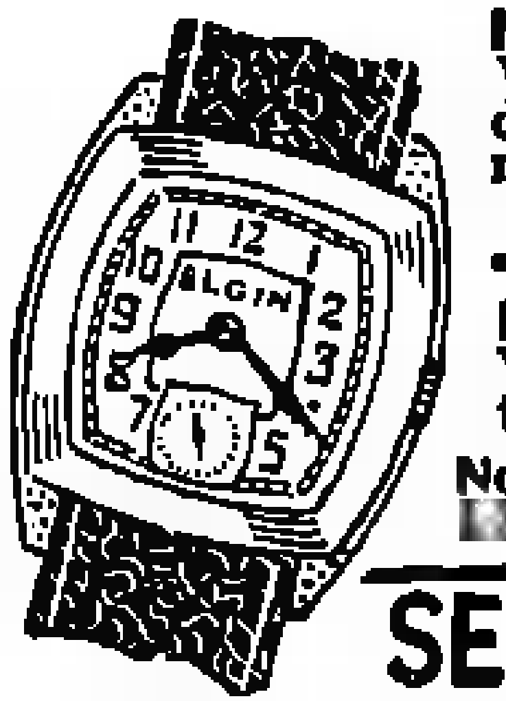
LOFTIS BROS. & CO. LASTING — WORTH-WHILE —
GIFTS OF JEWELRY

Let us send you one of our new style, exquisite Diamond rings for "her" gift. If you do not think it one of the handsomest Diamond rings ever shown and a tremendous bargain. RETURN AT OUR EXPENSE. Our 76-year old reputation is YOUR GUARANTEE OF SATISFACTION.

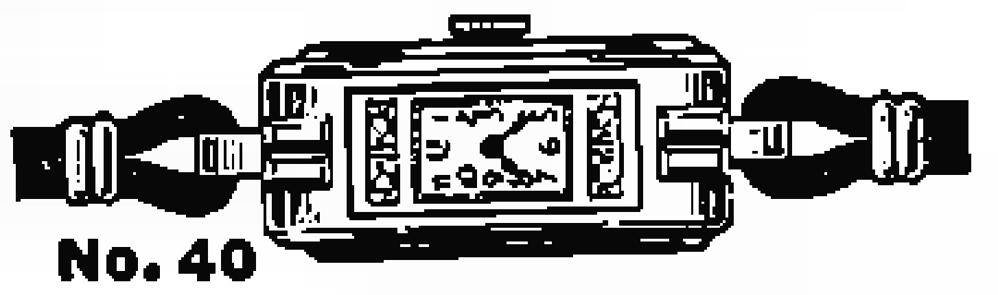
BUY NOW BEFORE OUR PRICES GO UP

No. 11—Exquisite Ring of Solid 18-K White Gold; Blue White Diamond . . . . $25. $1.00 a Week

No. 39—Solid White Gold Wedding Ring; 5 Diamonds $16.50 50c a Week



No. [illegible]—Man's Elgin Wrist Watch. Excellent timekeeper, good-looking wrist watch . . $16.50 50 Cents a Week



No. 40—Beautiful baguette wrist watch, natural yellow gold, with silk cord bracelet, excellent timekeeper . . . . $19.95 50 Cents a Week

SEND FOR FREE CATALOG

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Sound Effects for "Little Theater"

(Continued from page 111)

brushing a trap drummer's steel brush across a piece of light metal laid across an empty box, or two sand paper blocks gently rubbed together. Next start revolving the truck and increase the volume on bells and whistle. Accelerate the speed of all effects. When the train pulls into the station all sounds are up. The truck stops, the bell slows its ringing, and the steam is blown off by means of a siren whistle or better still a drum of compressed air which is allowed to escape.

The Sound of Marching Men

Marching soldiers are represented through the teeter-totter, Fig. 4, made from short lengths of 2"x4". The operator may sit on a chair and operate this with his feet, leaving his hands free for other uses.

The glass crash, Fig. 6, is two wooden boxes mounted one above the other on four posts, as shown. A break-away bottom in the upper box is operated by a string which draws an ordinary door bolt. A small hole is cut in the screen wire covering the space between the boxes, so that the bolt may be reset. A side of the lower box lets down. Small brass hooks hold it in position. Rocks are dropped down onto old bottles and broken pieces of glass placed in the lower box when the latch string is pulled. Any "business" calling for the sound of breaking glass may be handled with this effect.

For rain, drop a few handfuls of BB shot onto the tin bottomed rocking tray, Fig. 7, and then agitate them gently by rocking the tray. When dried peas are similarly agitated in a tray the bottom of which is screen wire, the sound is like surf on an ocean beach.

Wind is produced by revolving a drum made of ½" slats tacked to drum heads at 2" intervals over which a piece of canvas is passed. A convenient sized pipe is bent as in Fig. 8, and flattened on an anvil at the points where it passes through the small notches cut in the centers of the two drumheads. The stand is of 2"x4". One end of the canvas flap is tacked to the cross brace, the other is passed around the drum and held down by the weight of two light battens between which it is tacked.

Door Slams and Cannon Fire

A plank held under the foot and elevated at one end by a rope sounds like a door slamming or a cannon fired at a distance when released. This followed by a short rising note on a siren whistle, broken off with a blank cartridge fired into an empty barrel, is used when a cannon registers a direct hit.

Rattan switches struck across a leather cushion or piece of insulating wool give the sound of a rifle shot, while several switches rapidly struck are used for machine gun fire.

Very effective fire scenes may be created, with sound alone. An ordinary child's wooden cricket wheel simulates the crackling of flames, as does the breaking of berry crates. The breaking of laths followed by a door slam and a few shakes of the thunder sheet give the effect of crashing timbers and walls.

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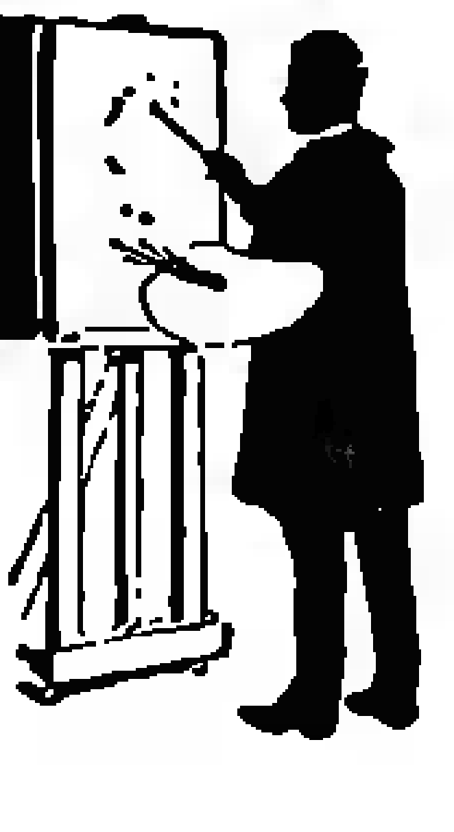

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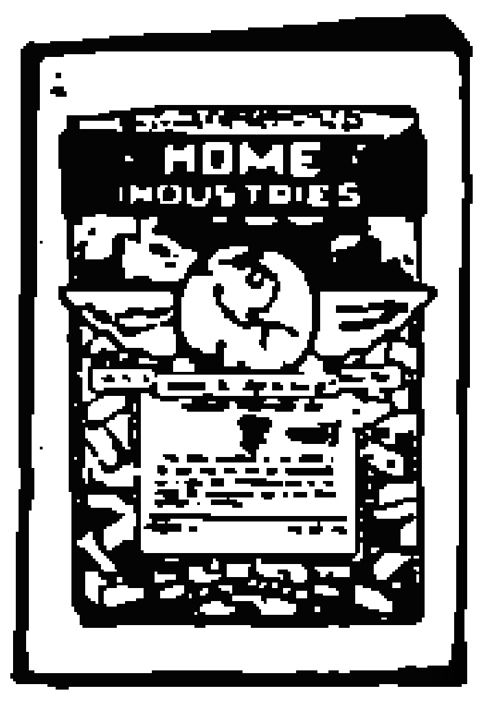

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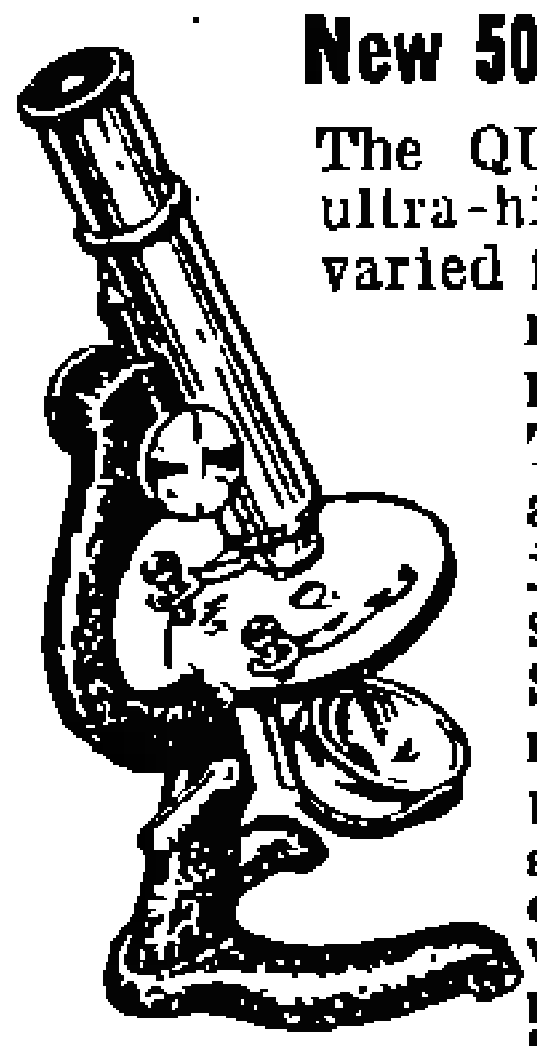

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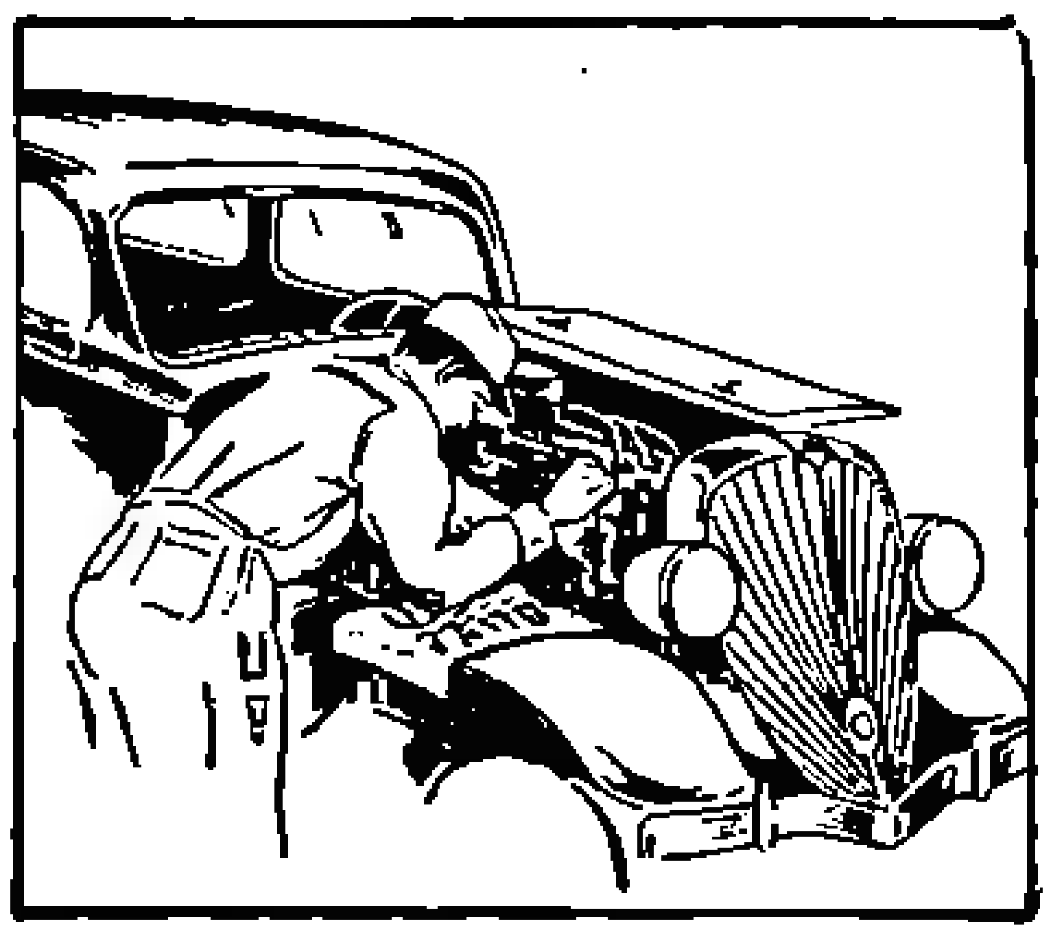

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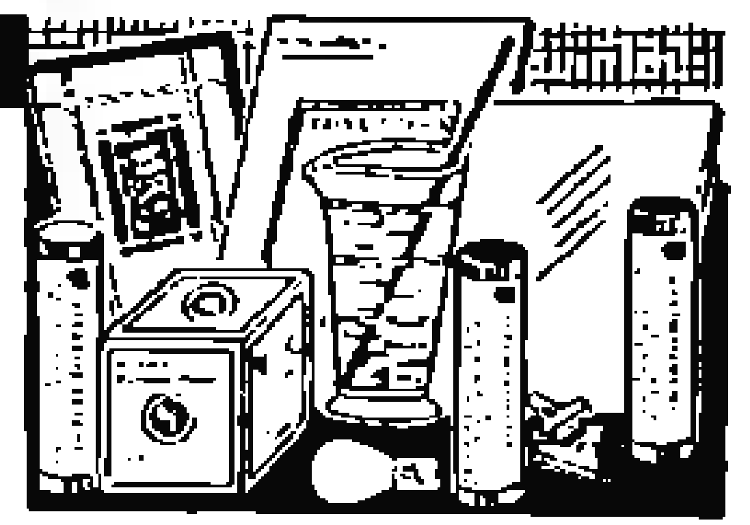

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Can Science End Disasters?

(Continued from page 61)

bination of them all, the speed of its spread through the most congested portion of the vessel, the passenger quarters, calls for added vigilance on board every craft that steams the seas. In this instance, the fire detecting apparatus was inoperative, or lagged behind the flames themselves. The emergency lights failed to work when the ship's lighting system went dark. The great volume of smoke choked the engineers, and this, combined with flames, made the launching of boats and the debarkation of passengers almost impossible. Testimony taken at the hearings bears out a belief that the gravity of the situation did not at once impress itself upon those in responsible charge. Furthermore, most, if not all, of the passengers and crew might have been saved by sending them at once forward to the bow of the *Morro Castle*, which remained untouched by fire.

In all of the instances of fire at sea, materials readily combustible have made the conflagrations possible. It would seem that the future building and reconstruction of first class passenger craft must call for the utmost in fireproof materials.

Passengers Should be Drilled

The *Morro Castle* brings to the fore the growing need for well organized, competent crews and the further need for compulsory drills of the passengers to take place at the beginning of a voyage, preferably just before the steamer leaves her port.

The major disasters of the sea seem to leave behind them very little in the way of heroic memories, except here and there where men and women have risen to great heights of renunciation. But the crews of sinking and burning ships, involved in utter confusion, stand forth with less distinction. In the case of the *Vestris* and the *Morro Castle* the preponderance of crew members among the rescued makes them less than heroic.

One of the points sometimes forgotten in the study of sea disasters is the important one of the size of steamers.

Are Liners Too Large?

Ships of sixteen and twenty thousand gross tons, those of the days of 1900, were the great craft. Then came the rivalry in speed and size and luxury. Each added hundred feet of length, each thousand tons more of displacement, has made the control of such craft less and less certain in the event of a major accident. Some modern liners are so large that if a fire ever got started or any other unexpected mishap occurred, no human being could hope to control the actions of passengers and crew. And now greater craft are planned.

The best minds will now concentrate on advancing the safety of ships at sea both as to non-inflammable materials, fire detecting and extinguishing means, and the better design, placement and handling of boats. After that a limit may also be set on the size of steamers although economies probably will force steamship lines to keep new ships to more moderate dimensions.

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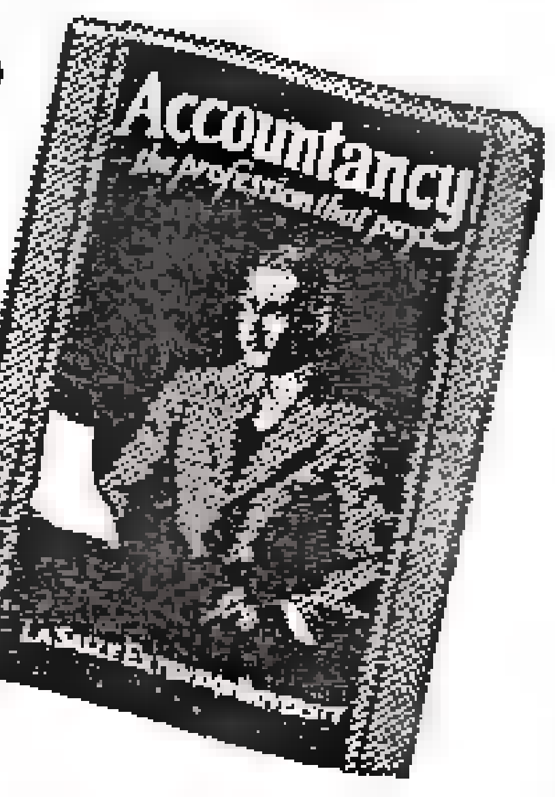

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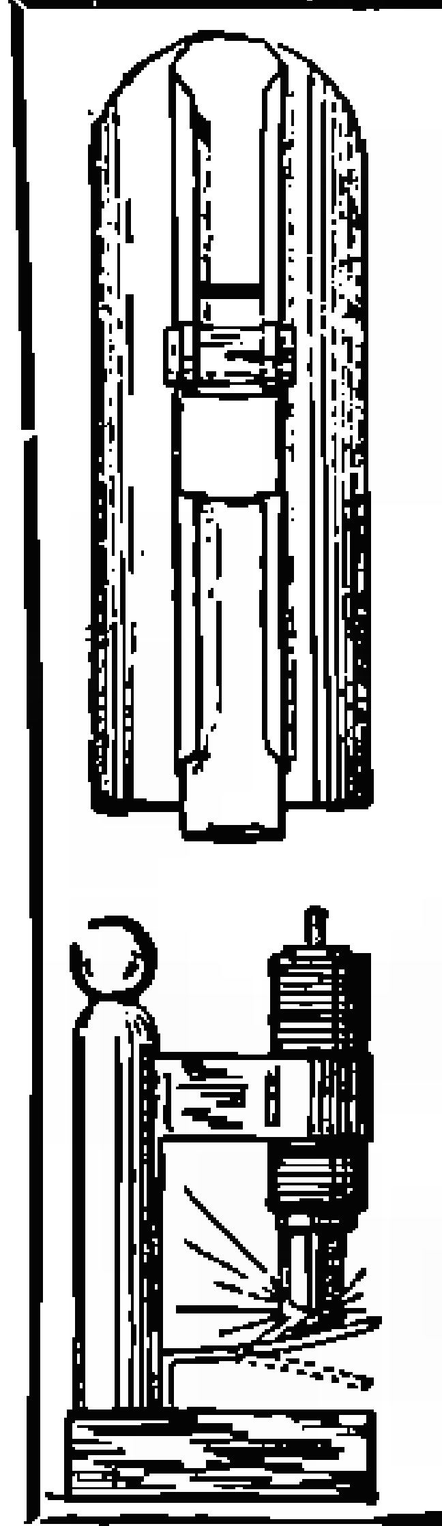

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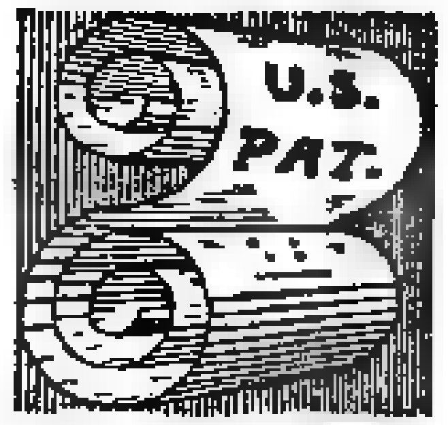

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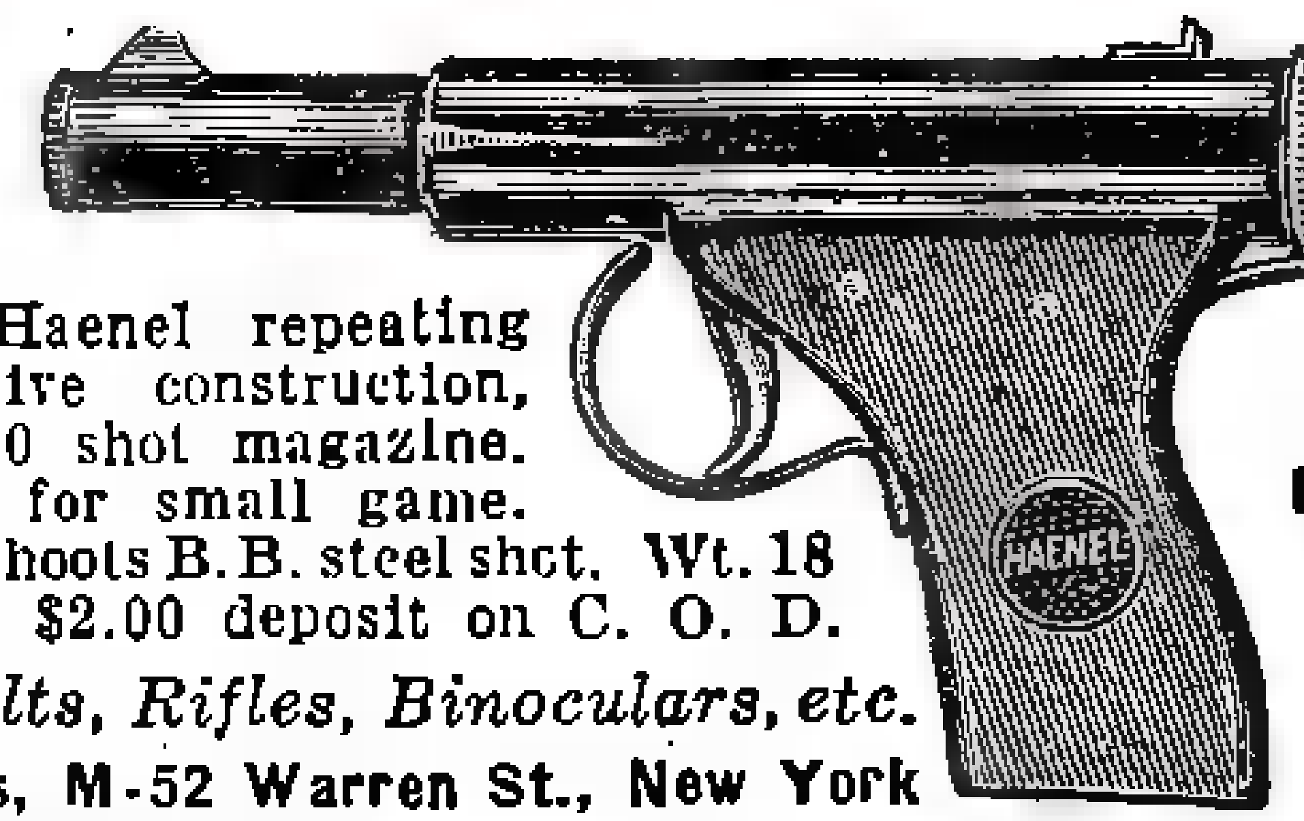

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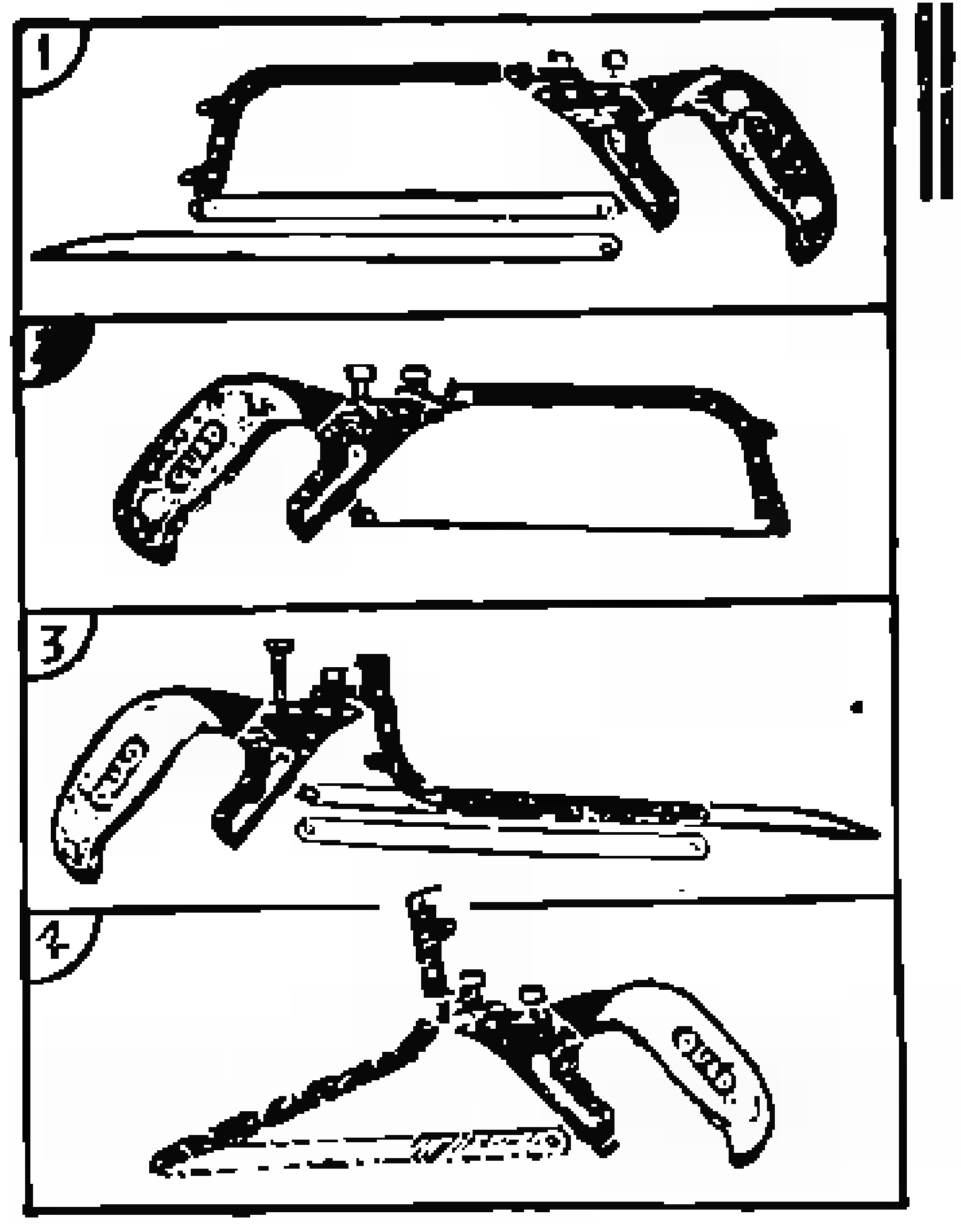

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Ford Discusses Industrial Future

(Continued from page 39)

ties of soy beans. These are processed under mass production technique for oils and other materials which are put to many uses in the great Ford factory system.

But, in order to give to the world the benefits of his experiments, he is showing how anybody from the young experimenter in his workshop to the farmer who may wish to grow soy beans for profit may get in on the ground floor of the new plastic industry.

Only Simple Equipment Needed

One may start with nothing more than a pestle, mortar, test tube, a quart of solvent and whatever useful odds and ends he may pick up around the house. Or he may go into it on a larger, though simple and inexpensive scale. Mr. Ford showed how this may be done in his "industrialized barn," exhibited at the Century of Progress exposition.

The first step after harvesting and drying the beans is to break them up and extract the oil. In the past this has been done by pressure, but even at best 30 per cent of the oil was left in the bean meal. The Ford method, developed to a high state of efficiency, involves the use of a solvent, which literally washes the oil out of the crushed beans.

Mr. Ford's chemists are conducting their extraction experiments with home made equipment set up in an old building at Greenfield Village. An old Ford engine is used for power. Much of the system consists of standard piping. The cost is small. Soy beans are stored in the loft. Directly under an opening in the floor of the loft is a set of rollers, into which the beans are fed by gravity.

How Oil Is Extracted From Soy Beans

The rollers flatten the beans into thin flakes and they then pass into the extractor. This is a water-main pipe fixed at a 10-degree angle to the floor and filled with a solvent, which is generally a high test gasoline or naphtha. The flakes are fed in at the bottom of the pipe and carried in a tumbling, washing fashion by a screw conveyor up to the top of the pipe. As the flakes work upward against the solvent practically all oil is removed and mixes with the gasoline.

The flakes move on up in the form of a meal, to the top of the pipe, where they leave the solvent chamber and drop into a steamer where the solvent which the meal has soaked up is vaporized and driven off by a current of steam. Meantime, the gasoline, fed in at the top of the pipe, works its way down against the meal, carrying the oil with it. At the bottom of the pipe is an upright piece called the neck. When the oil laden gasoline reaches the bottom of the pipe, atmospheric pressure forces it up into the neck, from which it overflows, leaving the extractor and carrying the oil with it. Distillation then turns the gasoline into vapor, which rises and passes through a cooling apparatus, which is nothing else but an old Ford radiator. Thus it is condensed back into gasoline and is used over and over.

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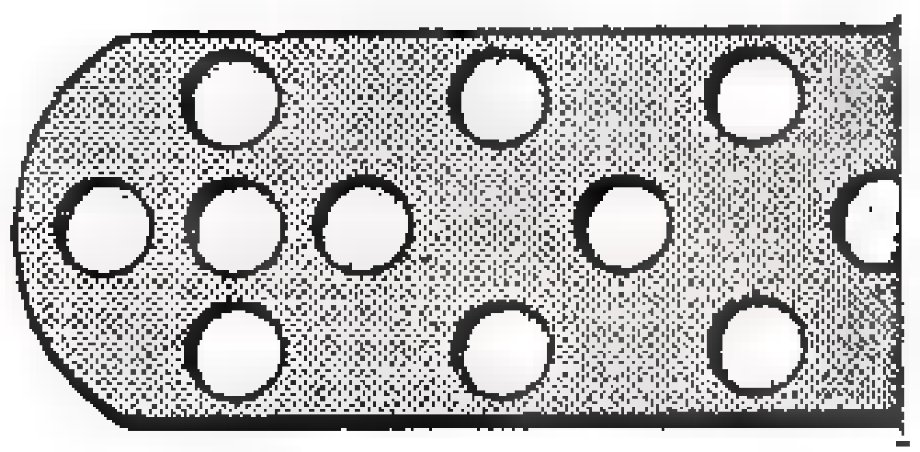
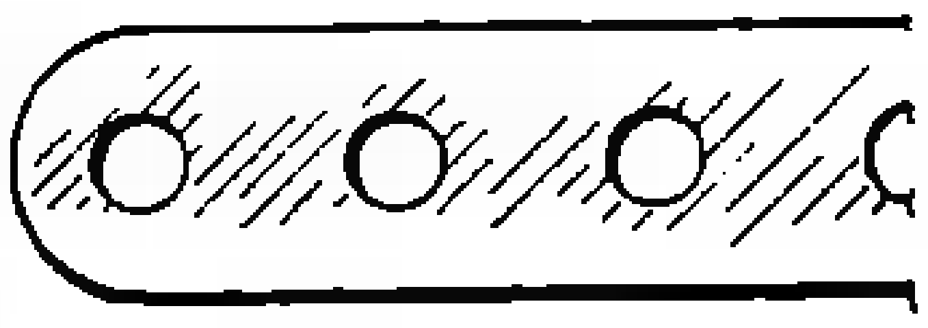


New Girder



Old Girder

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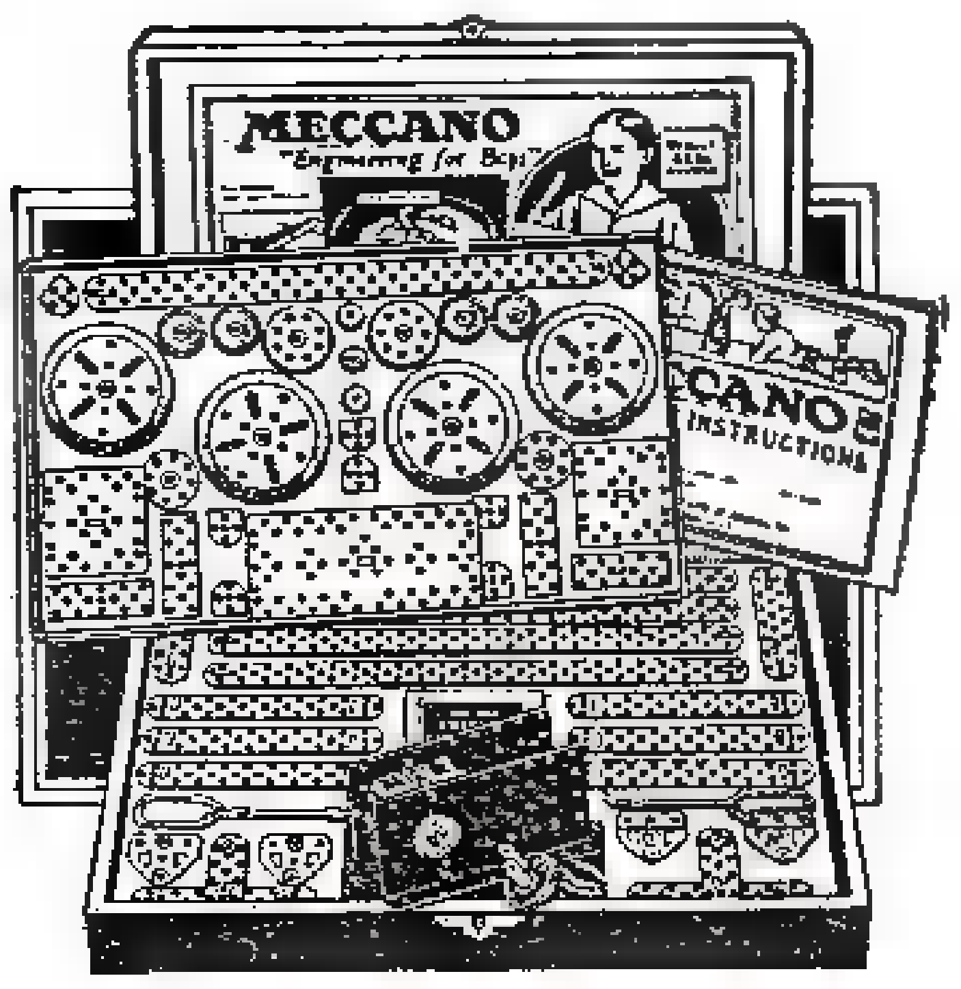
Look at the picture above—see how easy it is? Better still, examine the new models at your dealer's. Don't delay! Go to him and *ask him to show you the new Meccano with snap rivets.*



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29x5.00-19	9.25	4.05	1.00
30x5.00-20	9.60	4.25	1.00
28x5.25-18	10.30	4.70	1.10
29x5.25-19	10.65	4.85	1.10
30x5.25-20	10.95	5.05	1.10
31x5.25-21	11.35	5.20	1.10
28x5.50-18	11.65	5.30	1.10
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33x6.00-21	14.25	6.65	1.20
31x6.50-19	18.45	8.50	1.25
32x6.50-20	18.70	8.70	1.25
34x7.00-20	22.05	10.50	1.50
35x7.00-21	22.60	10.75	1.50

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$500 Prizes for Home Improvements

(Continued from page 48)

which there is a space filled with gravel.

Several methods for waterproofing basement walls are in use, but there seems to be only one proper plan. That is to tar the outside of the wall after chinking all cracks and openings with cement mortar. A drain placed along the bottom of the excavation, just below the basement floor level, will carry away surplus water. This tile must be non-vitrified and slope as indicated.

Additional wiring should be installed and checked over carefully before applying wall board. Outlets for reading lamps, electric toasters or heaters should be provided.

Corner Nooks Break Monotony

These furring strips, 1 by 2 inches and of suitable length, can be simply laid on the floor and the flooring nailed to them. The strips for the walls, however, should be fastened with toggle bolts or cement nails driven through them and into the concrete itself. Their spacing must coincide with the joints of the surfacing material to be used.

The installation of corner nooks will help to break the monotony of bare walls. Built in features are also easily possible. The simplest form of settee need be nothing more than a glorified wood box, built in a corner, with a cover which lifts off.

An attractive, easily made type of indirect lighting fixture, ideal for the finished basement is shown in one of the sketches. If the tones of the finish are warm, then it is suggested that copper or brass be used for both the cone and the top disc. If the tone is cold, then use tin or monel metal. Both the flat disc and the upper cone surface should be polished, then coated with clear lacquer.

Improving Basement Heat

It is important to check the floor joists overhead for sagging. If sags or low spots occur, bring the joists up to level again by either replacing the piers or building up under them. Girder posts whose lower ends are wet most of the time will rot at the lower end. This end becomes soft, unable to bear the load intended, and settling results. Because of this, plaster above cracks and windows and doors get out of plumb. If the girder posts are not in good condition, replace them with a concrete footing.

In many cases a fireplace can be built around the lower end of the chimney in the basement. In other cases a false fireplace can be built up, using the gas or electric heaters provided for them. In any case a fireplace will add much to the attractiveness of your basement room. Basements can also be heated by installing radiators or cutting small openings in hot air pipes leading to rooms which do not require very much heat. Padding placed between the basement wall and wallboard will keep heat in and cold out.

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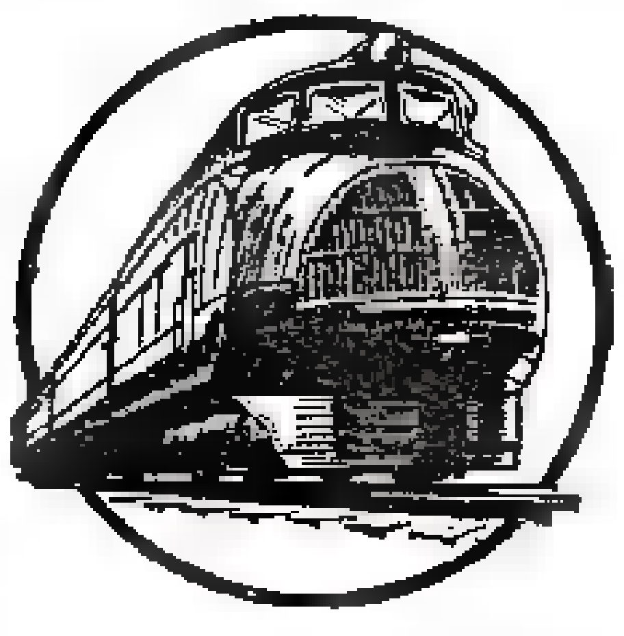
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Taking Micro-Photos With Camera

(Continued from page 63)

Care should be taken in selecting the first subject to be photographed. The beginner will naturally want results and is quite apt to fail if too difficult a subject is chosen for the initial attempt.

Mount slide on stage of microscope, focus and center, getting the view you wish to capture in the form of a photograph. Put light screen on microscope and mount the scope on the photomicrographic stand. Then turn your attention to the camera for a moment. It should be unloaded, with ground glass focusing screen in place, diaphragm opened as widely as possible, focus set at infinity or 100 feet and shutter opened at time exposure. Mount camera on attachment block and the latter on stand, lens of camera almost touching microscope eyepiece.

In a dark room, or with cloth hood covering head if working in daylight, inspect the picture that should appear on the ground glass, moving microscope adjustment until it is sharply in focus. Move slide until the picture is exactly centered as you wish it to be. Try moving the microscope lamp until you have the brightest and most uniform circle of light on the ground glass that can be secured.

Close the camera shutter, remove the ground glass and load the camera. Then prop the green light filter up in front of the light. The amount of exposure must be determined by experiment.

Science Trapped Kidnap Suspect

(Continued from page 43)

typically German. So was the use of the double hyphen and the word "gute" for good. There were lots of other indications.

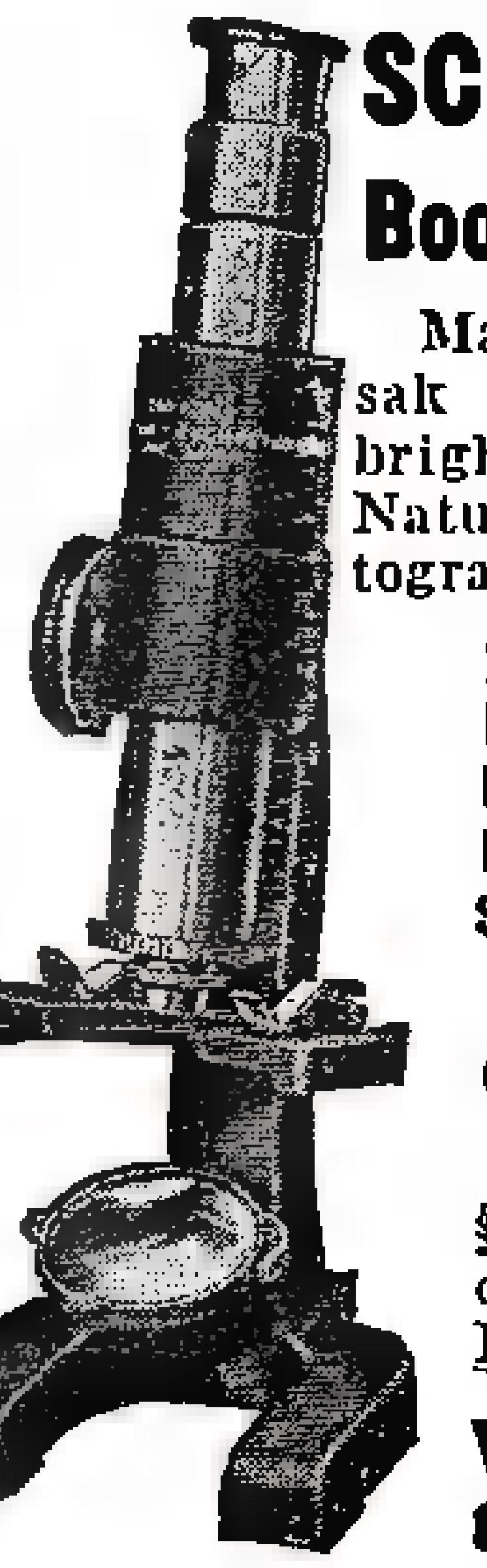
Apart from the fact that the ladder had been made by one skilled in carpentry, Farrar pointed out that the diagram of a box, which the kidnaper drew in giving directions how he wanted the money packed, showed that the writer built things from plans and that he knew cubicle content. He knew just how large a container would be required for the $50,000 ransom money. Moreover, the holes in the symbol with which the kidnaper signed all the notes had apparently been made with a carpenter's file.

In New York, meanwhile, a clinic of seven leading scientists—criminologists, pathologists, psychologists, and alienists—was set up and from their analyses the police were able to add many important details to the picture of John the kidnaper.

One report, that of a psychiatrist who carefully studied the ransom notes, contributed most materially to the increasing detail.

"I am led to believe," he stated, "that the writer of these letters is a very methodical person, very probably a German or Teutonic type. He is not given to personal display. He is reticent, very careful, very cautious. There are definite signs of a peculiarity in his social approach, he is shy."

(Continued on page 142)



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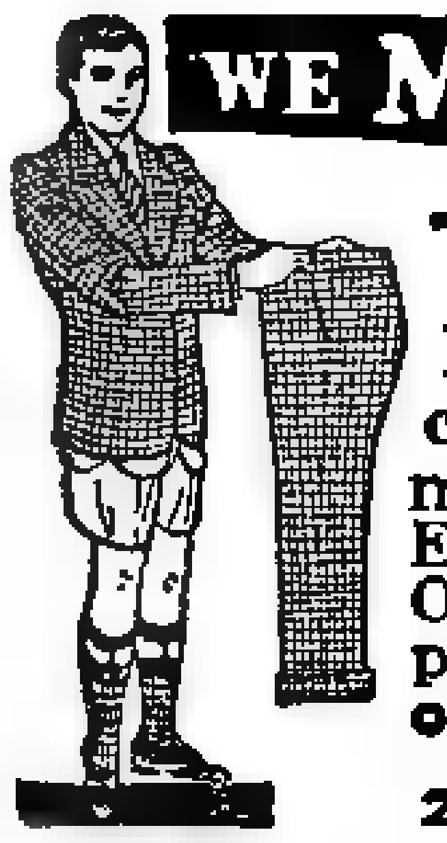

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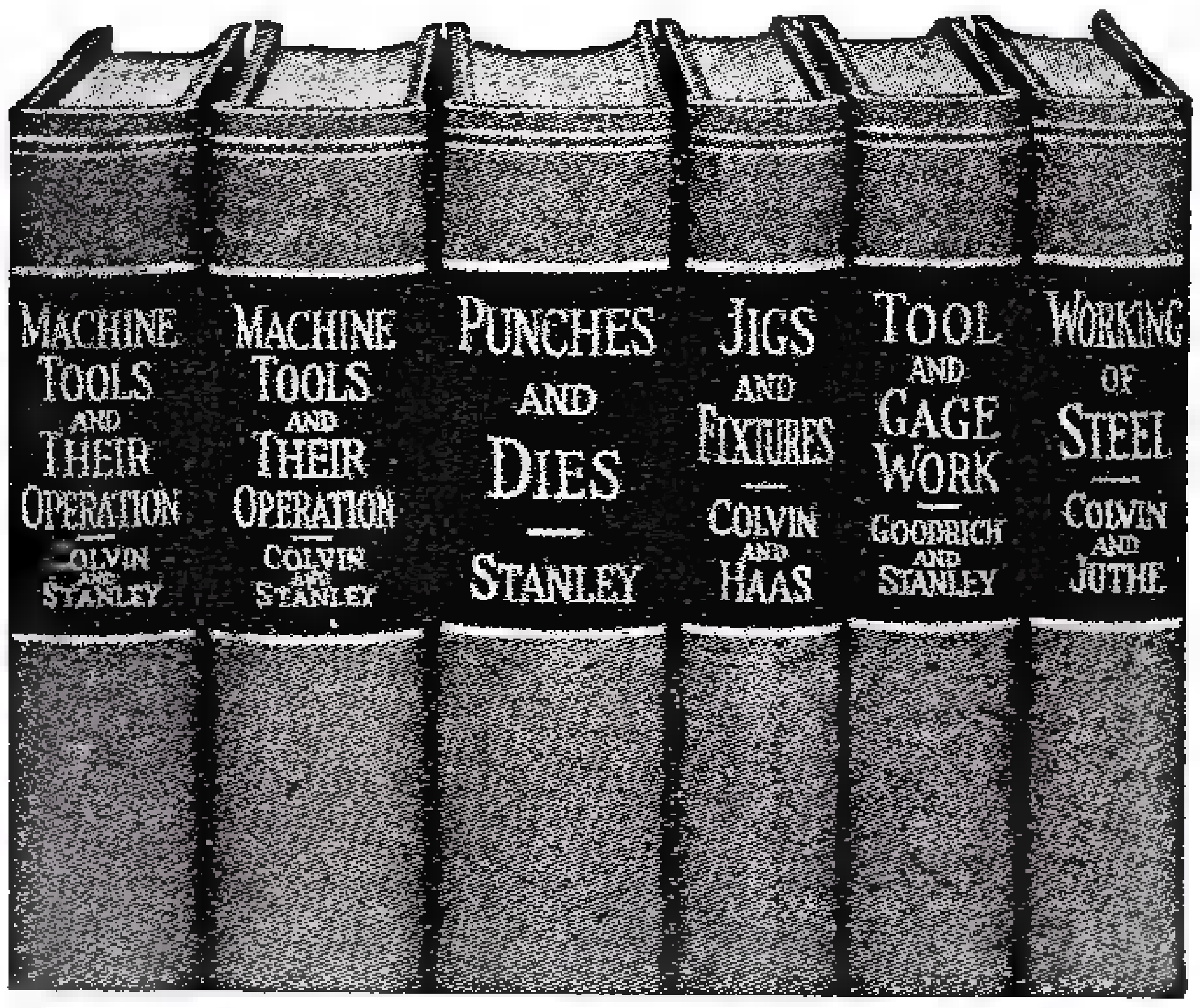
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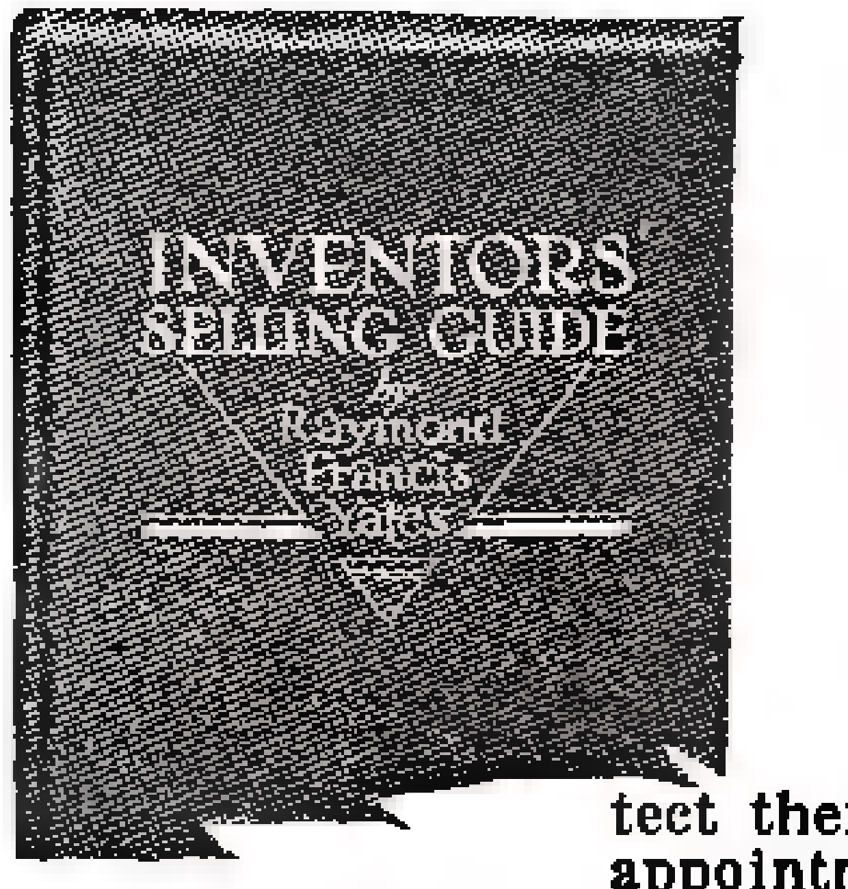
INVENTORS

SEE PAGE 12



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DONLEY PUBL. CO., Dept. M12, 509 Fifth Ave., New York, N. Y.

Science Trapped Kidnap Suspect

(Continued from page 140)

All these characteristics were to be found in Hauptmann, the methodical, reticent German carpenter. Detectives, after receiving this report and others, were able to picture in their mind exactly the type of person they must seek for the crime.

However, the scientist who might have become the hero of the hunt was Dr. Alexander O. Gettler, New York's toxicologist.

Dr. Gettler, after exhaustive tests of bills passed soon after the ransom was paid, reported that many of the certificates bore invisible bits of glycerine esters on their surface. On some of the bills he found an occasional bit of emery. These discoveries indicated that the man passing the money was a mechanic who ground his own tools.

In September, when a great many of the bills began appearing, Dr. Gettler again tested the money for further discoveries. He made a most curious find—he reported that most of the money had a musty smell, as though it had been long buried.

We know now that the bills had that musty smell because Hauptmann had buried them in his garage.

As the ransom money was passed into circulation by the unknown suspect, police stuck a colored pin into a large map of New York at the spot where a ransom bill appeared. As months passed the number of pins increased and seemed to concentrate in certain areas. Police noted that many of the bills were appearing along the route of the Lexington Avenue subway and concluded the passer of the money lived near the subway and traveled on it. A large cluster of pins on the map showed that the money was being passed in the Bronx and the police narrowed their net around that section.

Who knows, if Hauptmann had not been caught when he was, Dr. Gettler, other experts and the police might have found the one clue to his identity? Sooner or later one of the ransom notes would have yielded definite evidence that would have narrowed the search down to a very limited region and to a very limited group of people.

Fortunes in Needed Inventions

(Continued from page 86)

Our parcel post system has greatly stimulated the use of paper and corrugated packages. These packages are usually sealed with gummed tape automatically moistened. What is needed is a small hand machine that will moisten and apply the tape in a single operation.

Wires are held in electric light plugs by means of small set screws. On the whole this is an unsatisfactory method due to the fact that the frayed ends of the wires cause short circuits and the screws eventually become loose. A better and more foolproof method of holding these wire ends should be devised.

A simplified coaster brake that could be applied to children's velocipedes would be a quick seller. It should be made to sell under fifty cents.

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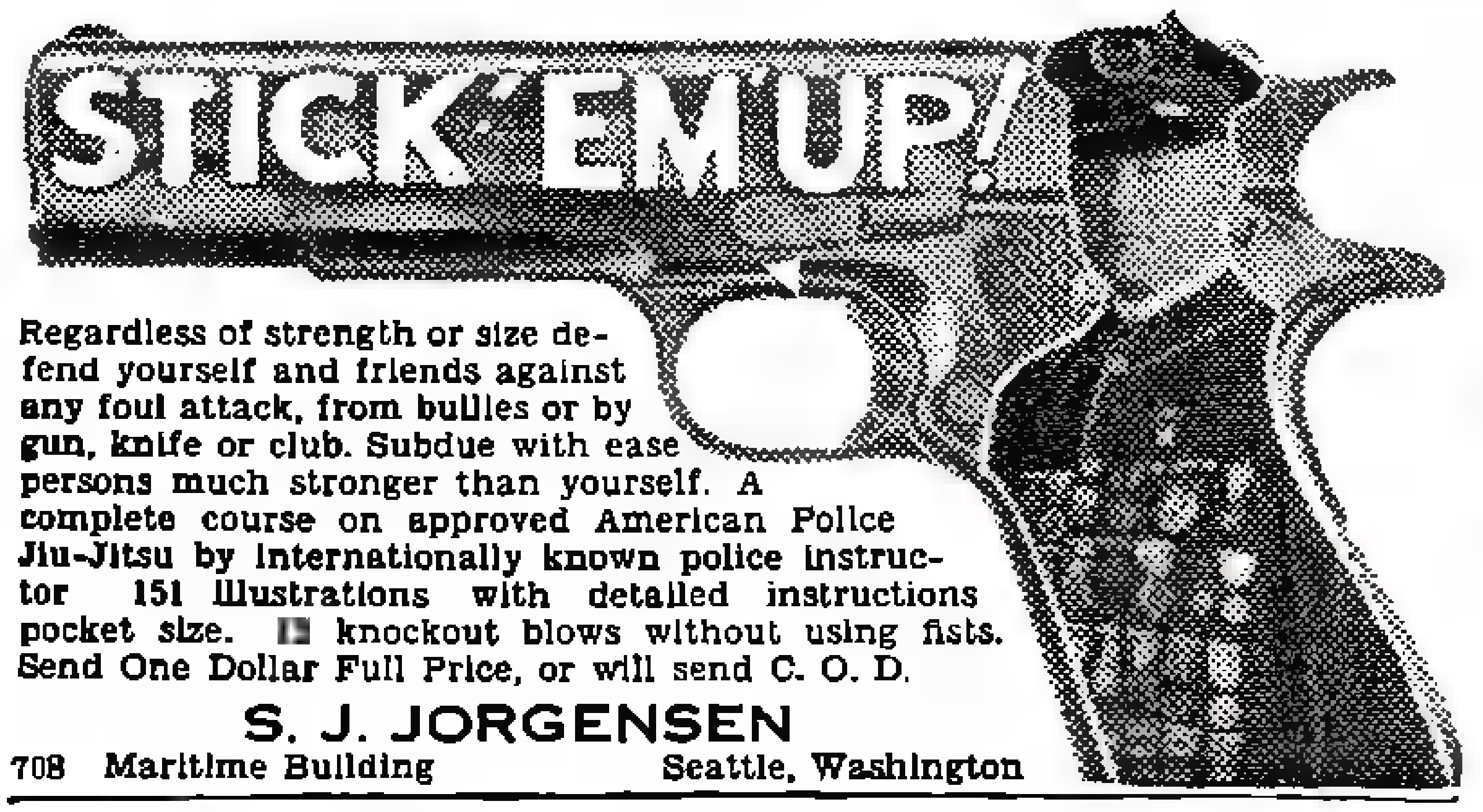

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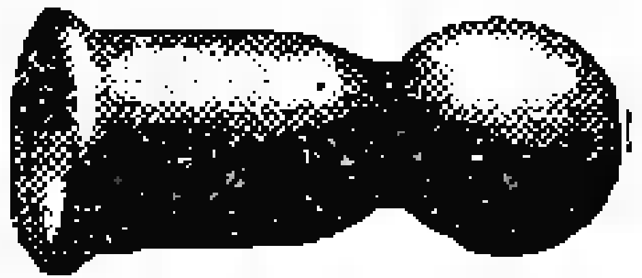

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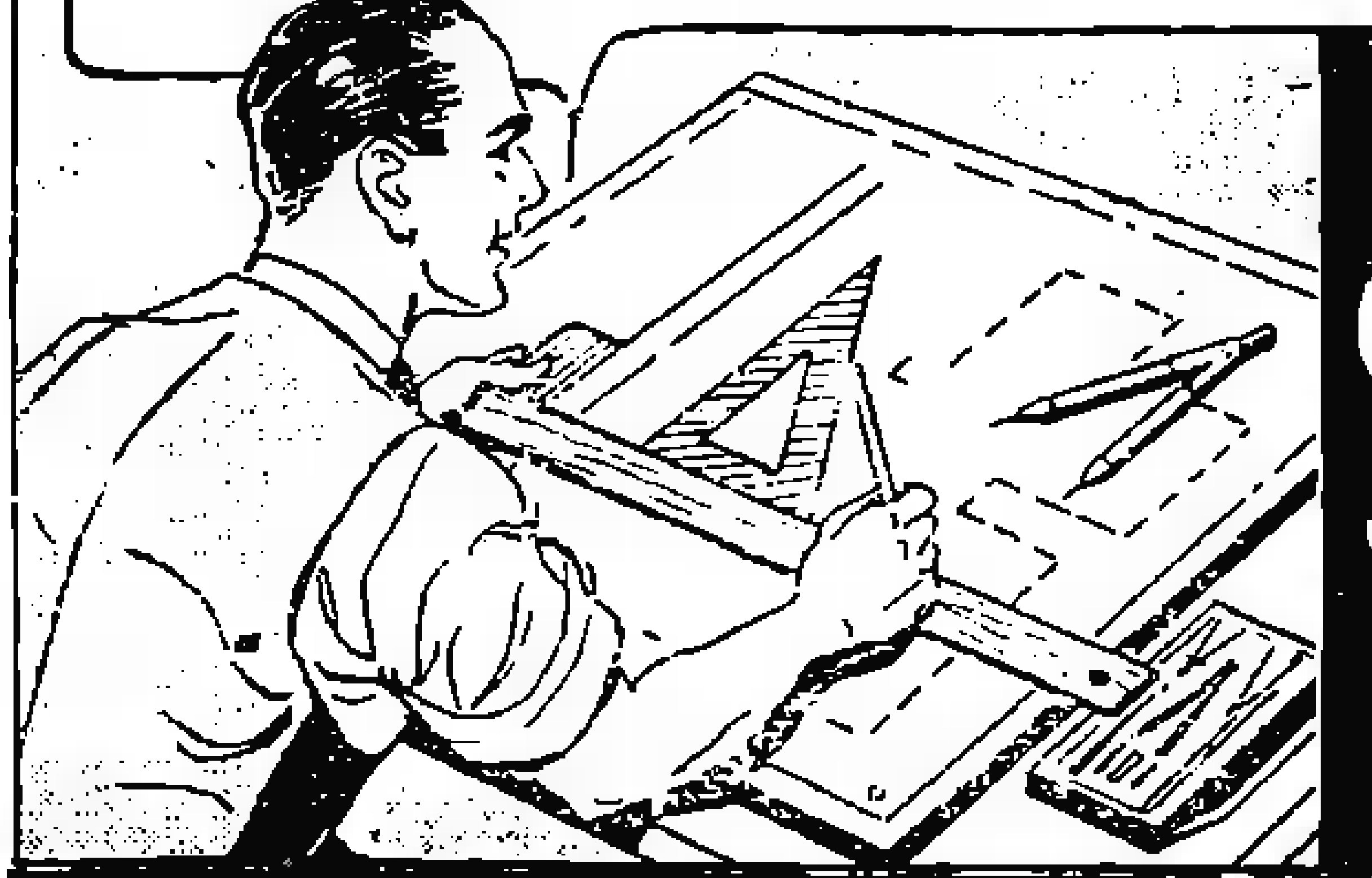

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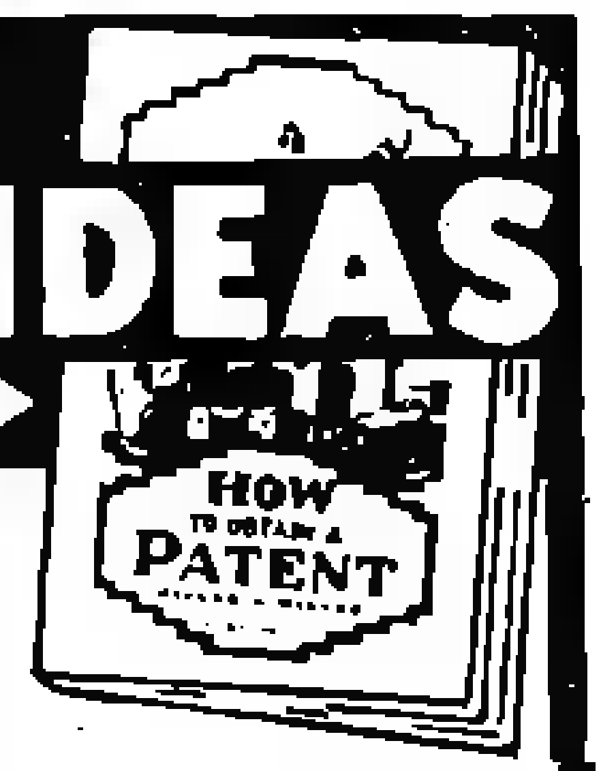
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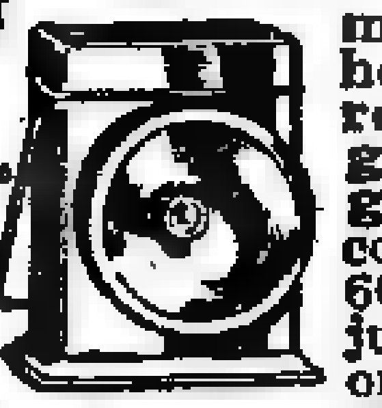

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30x4.50-21	**2.40**	0.85	28x5.50-18	**3.35**	1.15
28x4.75-19	**2.45**	0.95	29x5.50-19	**3.35**	1.15
29x4.75-20	**2.50**	0.95	30x6.00-18	**3.40**	1.15
29x5.00-19	**2.85**	1.05	31x6.00-19	**3.40**	1.15
30x5.00-20	**2.85**	1.05	32x6.00-20	**3.45**	1.25
28x5.25-18	**2.90**	1.15	33x6.00-21	**3.65**	1.25
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31x4	**2.95**	0.85	34x4½	**3.45**	1.15
32x4	**2.95**	0.85	30x5	**3.65**	1.35
33x4	**2.95**	0.85	33x5	**3.75**	1.45

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7.50-20	**6.95**	3.75	36x6	**9.95**	3.95
8.25-20	**8.95**	4.95	34x7	**10.95**	3.95
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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912.

Of MODERN MECHANIX AND INVENTIONS, published monthly at Minneapolis, Minn., for Oct. 1, 1934.

State of Minnesota } ss.
County of Hennepin }

Before me, a Notary Public in and for the State and County aforesaid, personally appeared W. M. Messenger, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the MODERN MECHANIX AND INVENTIONS and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are:

Publisher, W. H. Fawcett, Breezy Point, Minn.
Editor, W. J. Kostka, Minneapolis, Minn.
Managing Editor, D. E. Lurton, Minneapolis, Minn.
Business Manager, W. M. Messenger, Minneapolis, Minn.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

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3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.)

None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

W. M. MESSENGER,
Business Manager.

Sworn to and subscribed before me this 26th day of September, 1934.

[SEAL]

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529 S. Seventh St. Minneapolis, Minn.

Speed Lost in America's Cup Races

(Continued from page 55)

shape but, because of difficulty in pronouncing the word, it became known as the "Greta Garbo."

When reaching, or sailing with the wind aft of the beam, the Genoa jib, long headsail that is carried aft of the mast, was used. In running before the wind the yachts used parachute spinnakers, extending around both sides of the yachts and bulging far up in the air forward.

Endeavour went a step farther. It introduced a huge ventilated spinnaker with six holes that gave it the name "Annie Oakley." The holes permitted air which was not pulling to escape. This sail was given the credit for one of *Endeavour's* two victories in the races.

British Lost Professional Crew

With this background a brief resume of the races will show how badly *Endeavour's* crew handled her canvas. In fairness to Sopwith it should be noted that he lost his professional crew just before coming to America when the men struck for higher wages. He hastily substituted a volunteer amateur crew that lacked experience on the British sloop.

In the very first contest the race committee courteously delayed the start 15 minutes when *Endeavour's* mainsail gear fouled. In the race she suffered further delay in dousing her headsail while setting the spinnaker.

In the second race she had a torn jib at the start, later lost control of her reaching jib, and on the last leg fumbled in setting the Genoa. The third race saw the British crew taking six minutes to set the Annie Oakley and later dragging her canvas in the sea when setting the reaching jib. In the fourth the crew was slower than *Rainbow's* in handling sails on tacking. Shortly after the start of the fifth race the spinnaker was tangled up for four minutes, while *Rainbow's* men completed the same operation in one minute. In the final race the British were slow in handling sails and again got the spinnaker tangled.

Sopwith Missed Mark Twice

Sopwith's most glaring errors were evident in the fifth and sixth races when he missed the stake boats marking the turns. In the fifth he lost a minute when he aimed wrong at the mark and in the sixth, while leading, he went wide of the second mark and had to fall behind *Rainbow* to round it.

Endeavour was believed to be the faster ship in a strong wind. This proved to be true. She won the first two races when the wind ranged from nine to 16 miles an hour. Her first defeat in the third saw the wind only at six miles. Light winds persisted in the remaining races, except the fifth when it ranged from 14 to 20 miles.

Many Americans regretted the defeat of the fast British ship in the fifteenth attempt to regain the cup. They are looking forward to another challenge next spring.

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FOR INVENTORS And Mechanical Minded Men

How TO OBTAIN A

Answers to Questions

on Page 20

1 For protection. A patent gives the inventor title for 17 years.

2 Dr. Elihu Thompson (over 700 Patents). Dr. Miller Reese Hutchinson (approximately 1000 patents). Thomas A. Edison (1101 U. S. — 1279 Foreign).

3 (1) Goodyear. (2) Nobel. (3) Sinfelder. (4) Roentgen.

4 The U. S. Patent Office has said in this connection that "the preparation of an application is a highly complex proceeding and generally cannot be conducted properly except by an attorney trained in this specialized practice."

5 A partial list of some inventions and discoveries is available by writing for my booklet. Space here is too limited.

6 It is generally advisable to approach a manufacturer only when application covering the invention is on file in U. S. Patent Office.

7 Attorney's fees can be paid in installments.

8 No; having a patent attorney at Washington can save expense and time.

9 The first adding machine.

10 Quantity production of Industry. He built the first machinery for standardizing the parts and manufacture of government muskets in the War of 1812.

CLARENCE A. O'BRIEN

Registered Patent Attorney
317-P Adams Building
Washington, D. C.

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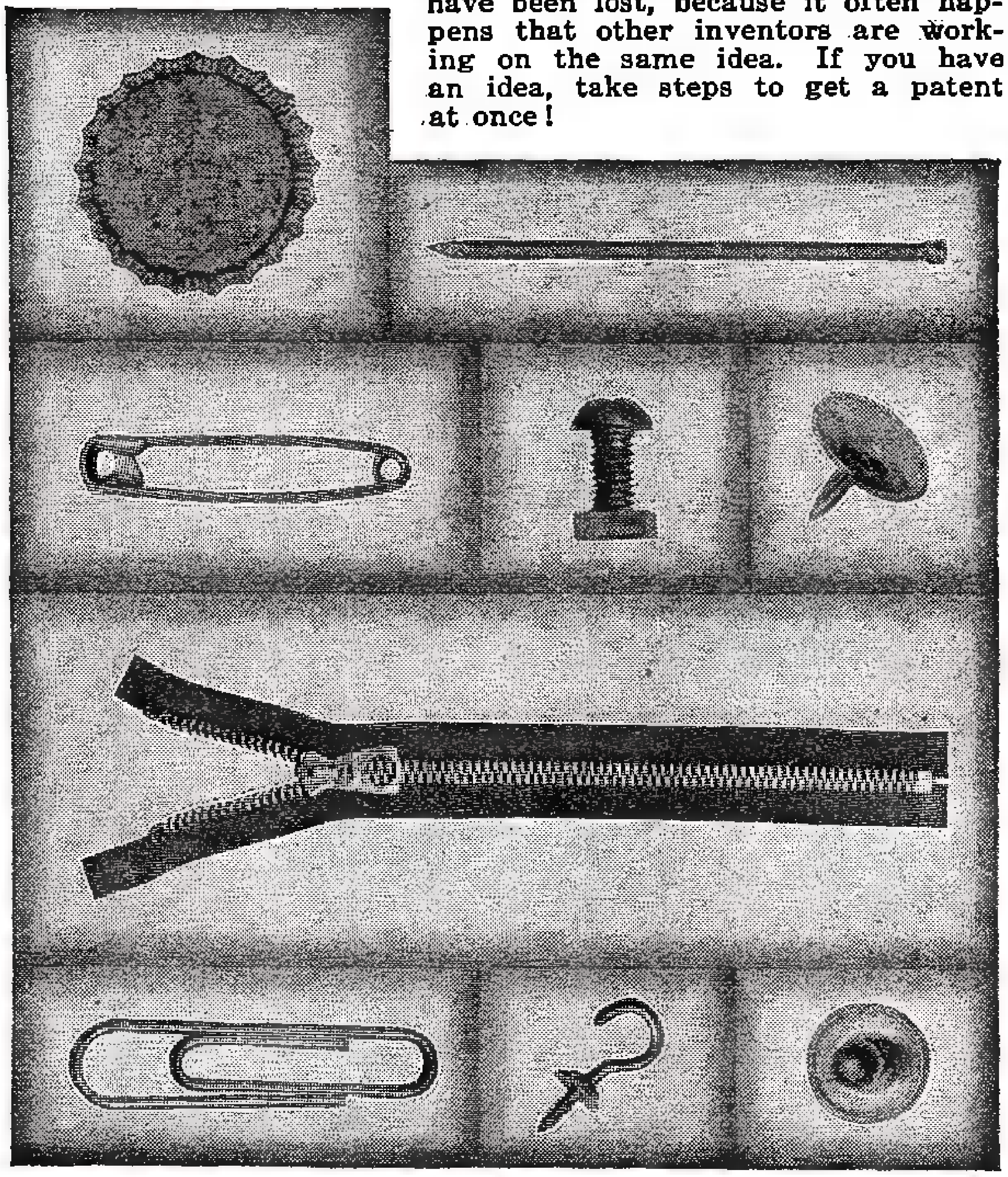
Small Ideas May Have Large Commercial Possibilities

If you hope to realize profits from your invention, you must protect it with a United States Government Patent. Otherwise you may find that all your time and labor have been lost, because it often happens that other inventors are working on the same idea. If you have an idea, take steps to get a patent at once!



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THE FIRST IMPORTANT STEP IN SECURING A PATENT

is to obtain the services of a Registered Patent Attorney. Establish the date of your invention as explained in My Book and disclose your idea to him in correct form. He then makes a SEARCH of the Patent Office Records and reports to you on existing U. S. Patents which might bear on your invention, giving his opinion on the advisability of proceeding and filing formal application. How this inexpensive step can save you money, time and delay when Patenting your idea—how it tells you whether or not it is worth your while to file formal Application—all is explained in My Big Book—SEND FOR IT TODAY. If you have developed some improvement, something which adds to the usefulness of any product—whether this product is Patented or not—you should protect your improvement with a Patent at once. Send for My Big Book which tells you how.

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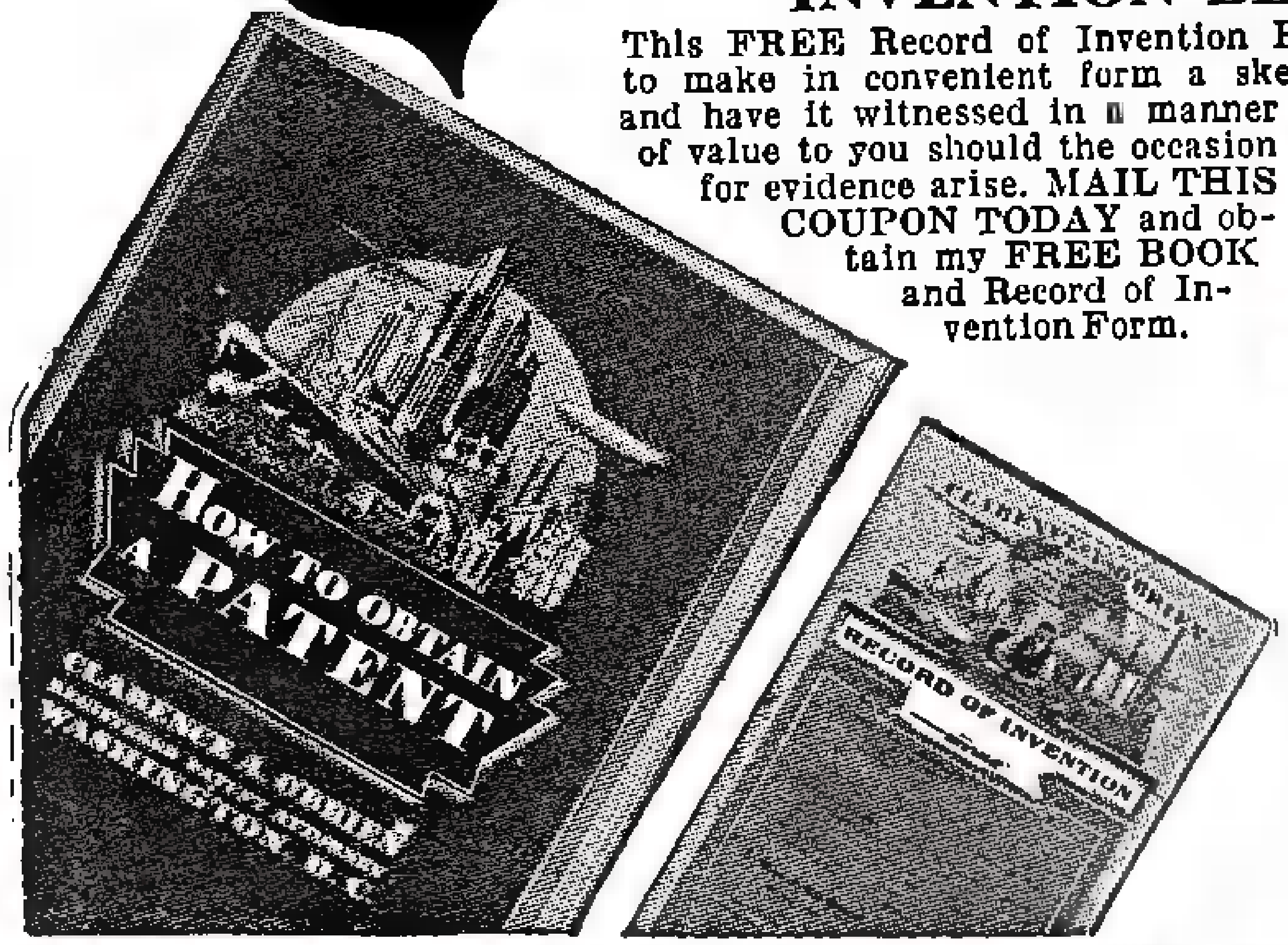

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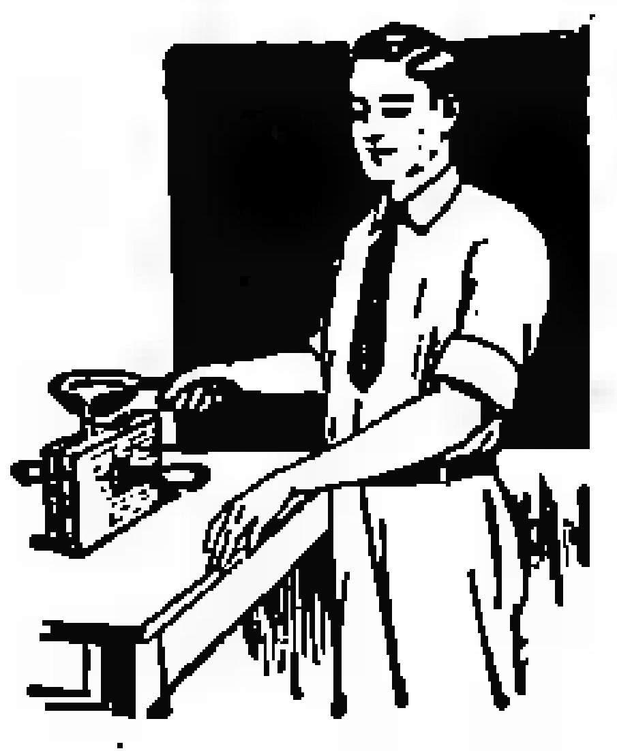

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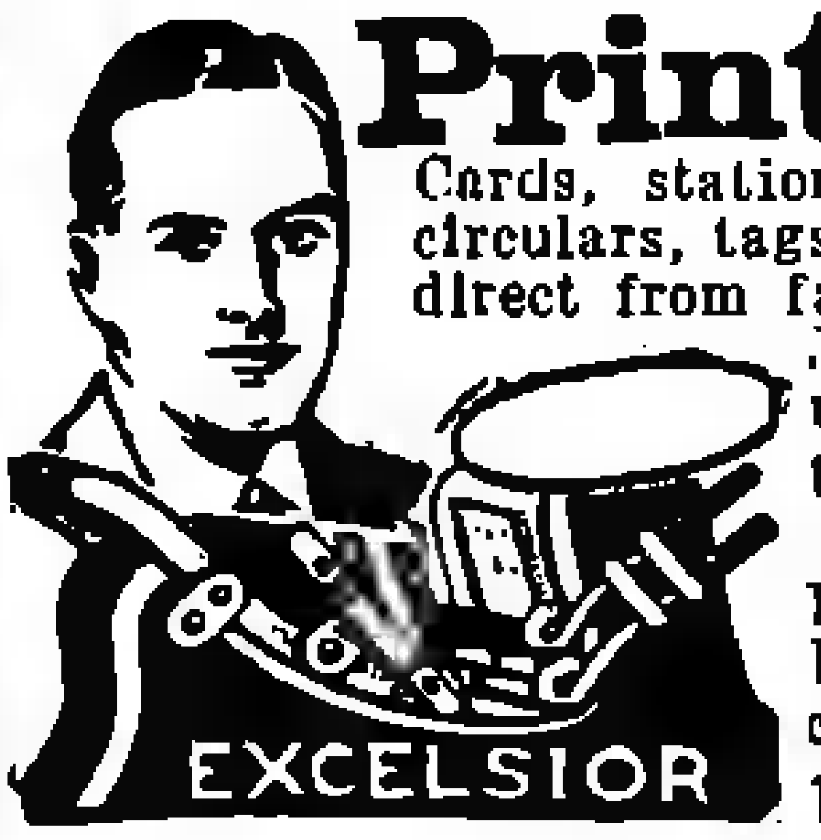

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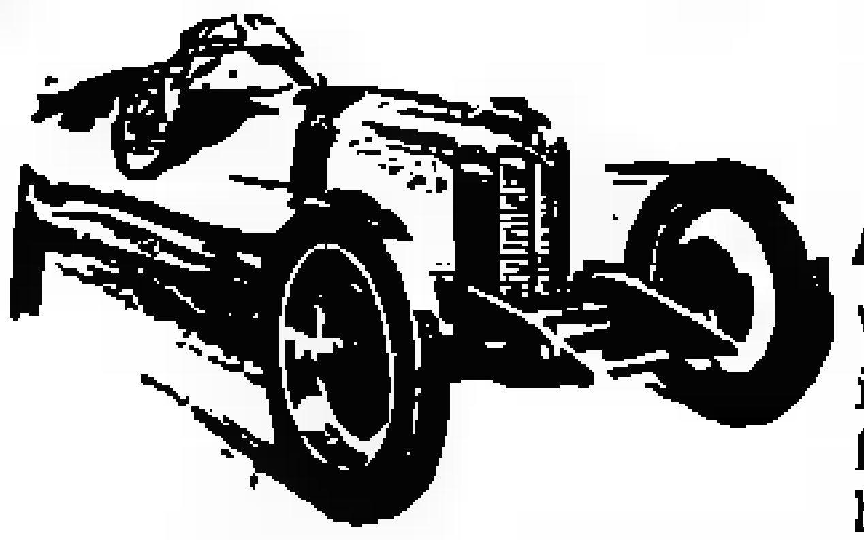

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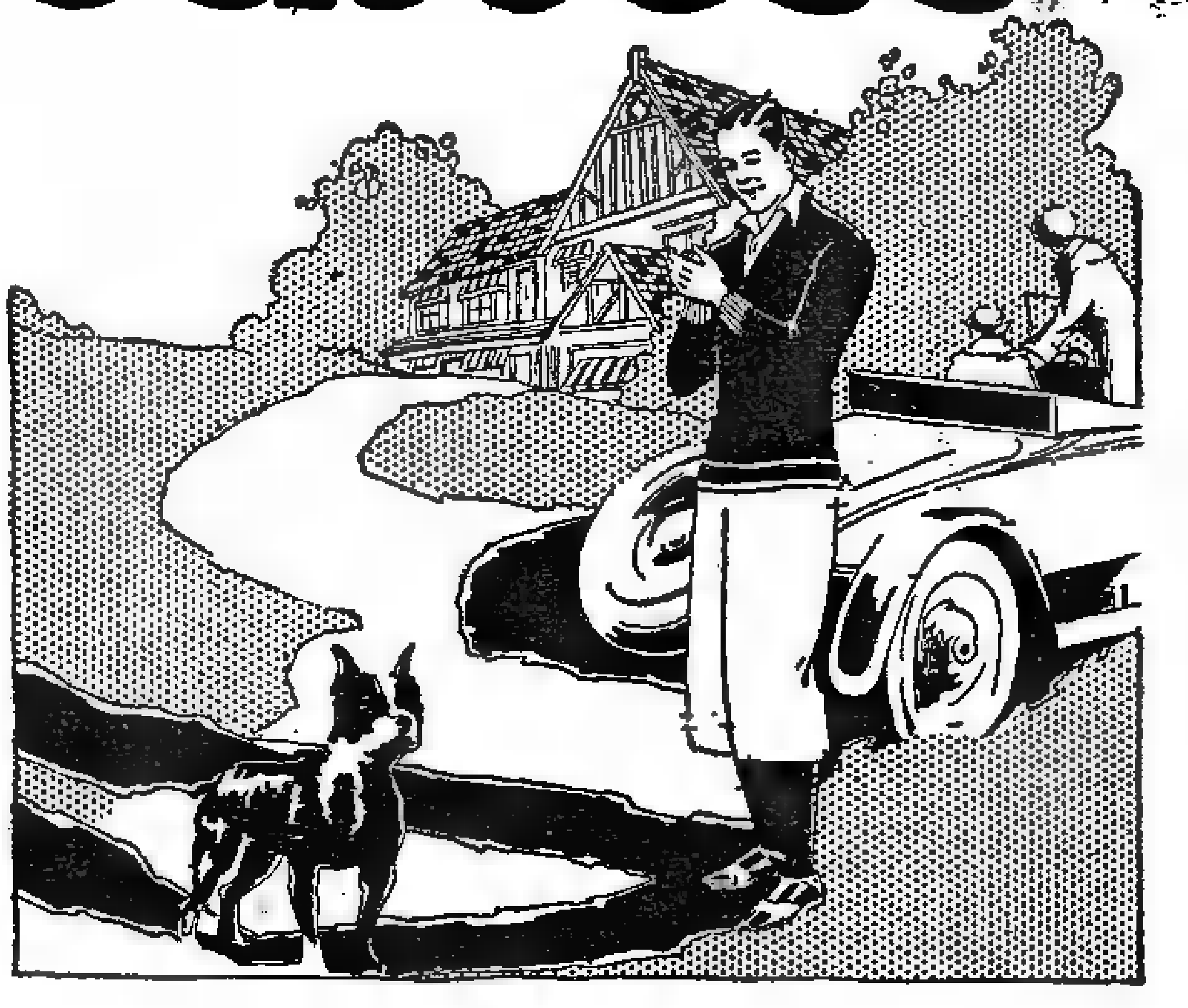

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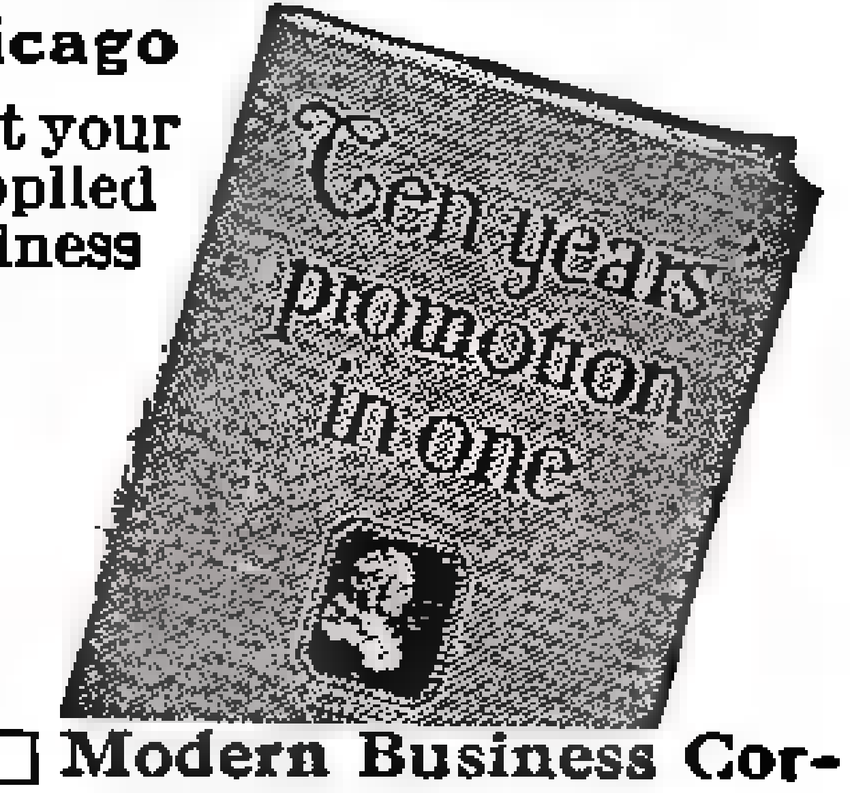

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Preparing Car for Winter Driving

(Continued from page 65)

fore putting in anti-freeze. To clean out sludge in the system, fill with water containing all the sal soda it will dissolve. Then cover the radiator, retard the spark and run the engine until boiling takes place. Let the engine stand several hours, then drain the system and flush several times.

Winter operation of the car makes heavy demands upon the storage battery. Greater power is required by the starter in cranking, yet the capacity of the battery is considerably decreased by the lowered temperatures. A partly discharged battery freezes readily. See illustration for suggestions on proper care of the battery.

The generator charging rate can be safely increased to 18 amperes in winter. On most cars this is done by moving the third brush in the direction of rotation of the generator.

Winter Grease, Oil Preferred

As soon as cold weather comes, the grease in the transmission, differential and steering gear should be thinned out with light motor oil. Do not wait until the grease becomes so stiff that shifting of gears becomes difficult. Make the grease just thin enough so that it will remain fluid in the coldest weather. A surer method is to drain out all the grease and replace it with a special winter grease.

The engine oil should either be changed to a winter grade which is thinner than the summer oil, or thinned by adding a quart or two of kerosene. Here again the safest method is to drain the oil and put in a winter grade. The drawback to the use of kerosene is that it will vaporize or boil out of the oil.

Dilution of crankcase oil with fuel is another winter driving problem. Fuel entering the combustion chamber strikes the cold cylinder walls and mixes with the oil upon them. As the piston travels up some of this mixture of fuel and oil passes the rings and is gradually worked down into the crank case. Frequent starting, idling and cold driving results in some cars showing an increase rather than loss of oil. Under these conditions it is advisable to change the oil frequently, every 250 to 500 miles.

Selecting a Winter Gasoline

There are three important requirements for winter gasoline. It should vaporize readily enough to start on the coldest days; it should not have ingredients which will condense readily on the cylinder walls and wash down into the crankcase; it should not knock or ping in the motor. If your motor does not ping on regular gasoline, its starting qualities and tendencies to produce dilution will be satisfactory in winter. Third grade gasolines will have a greater tendency to knock and, as a rule, greater tendencies to dilute the lubricating oil than the regular.

Premium fuels should be used for motors with very high compression ratios where the anti-knock qualities must be very high.

Excessive carbon deposits tend to accumulate with intermittent winter driving. If pinging begins, an ethyl gasoline should be used to reduce the knock.

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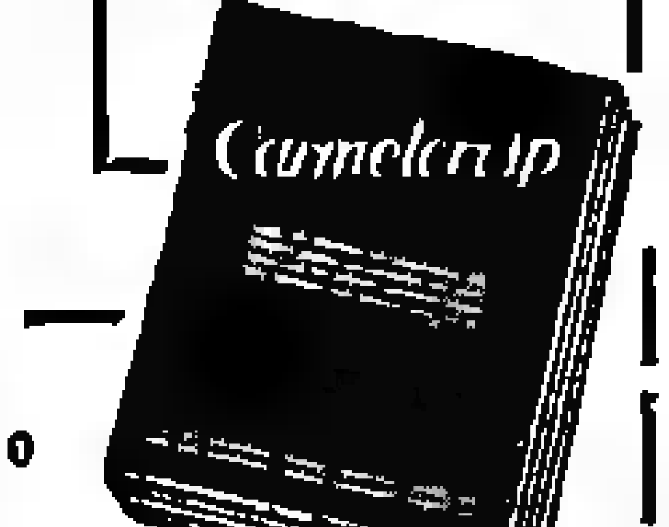

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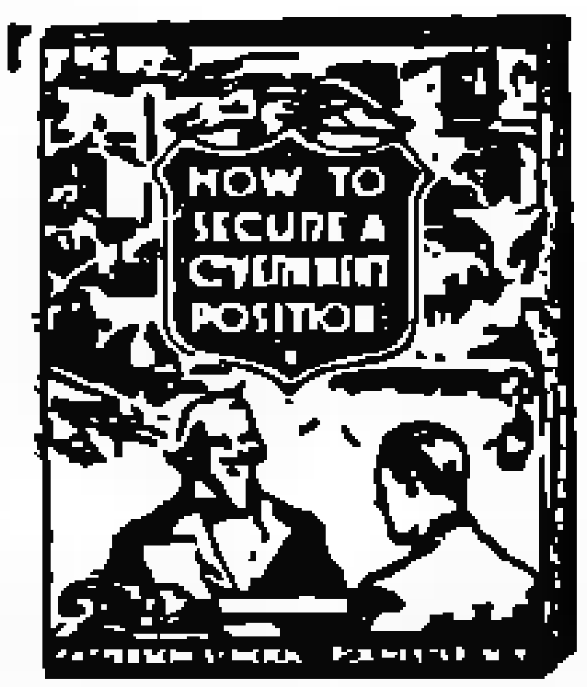
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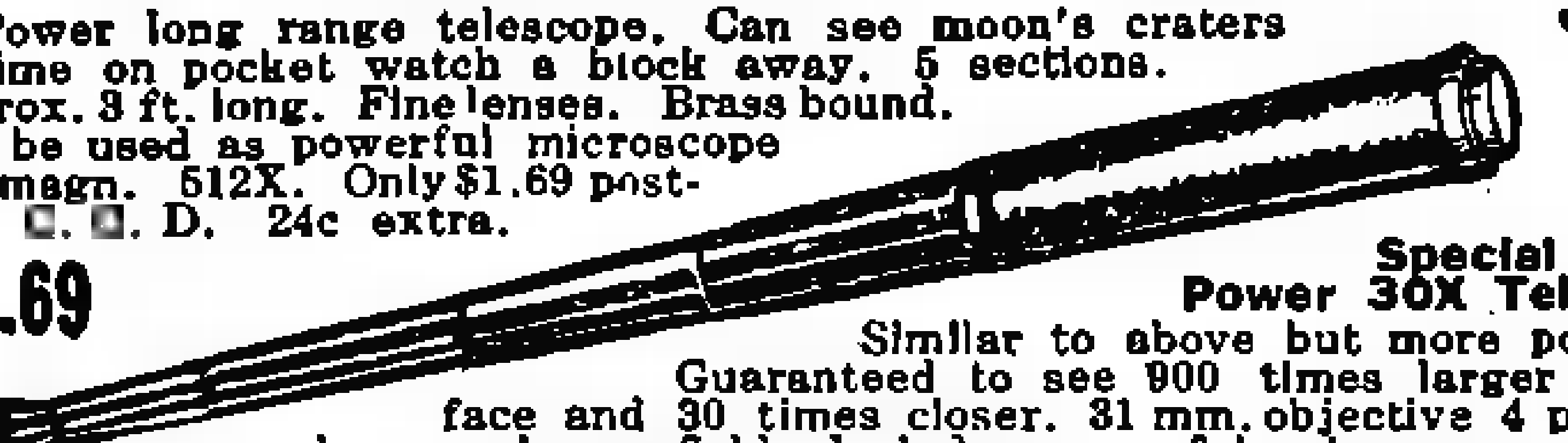

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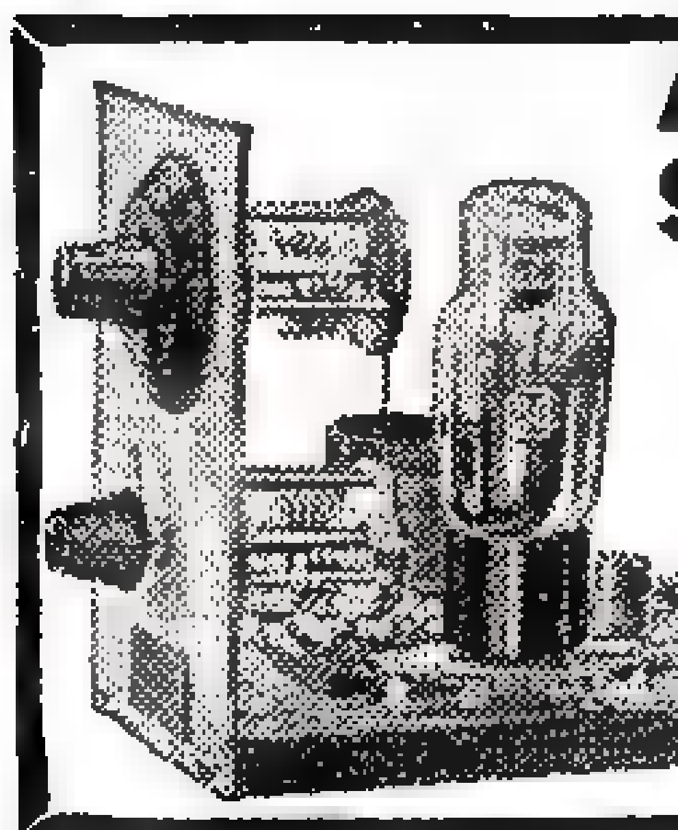

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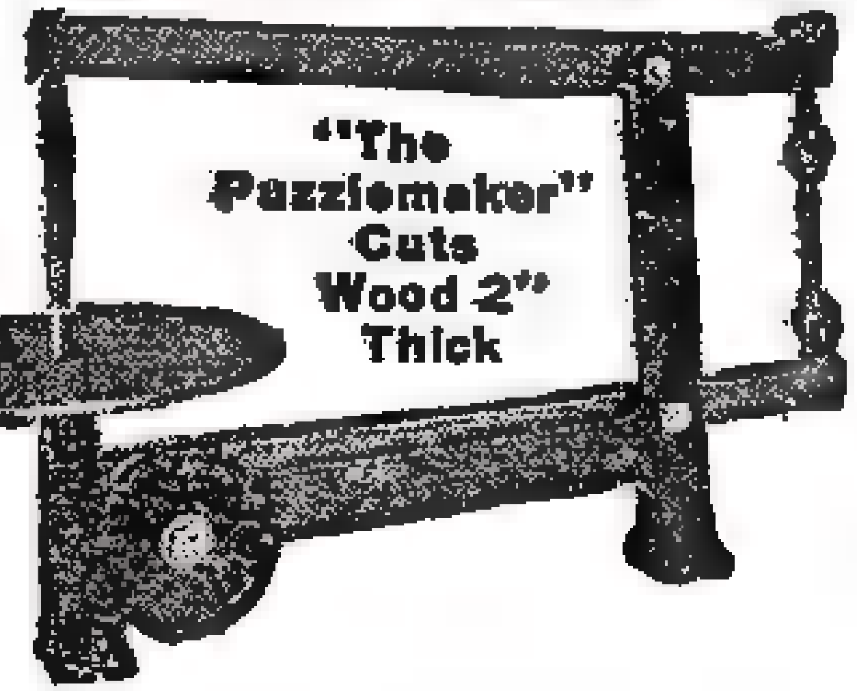

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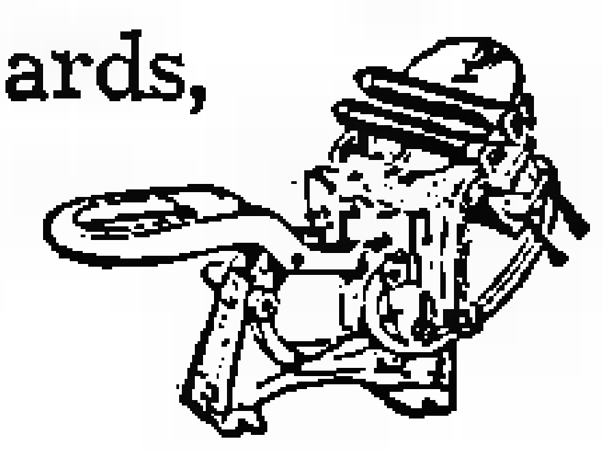

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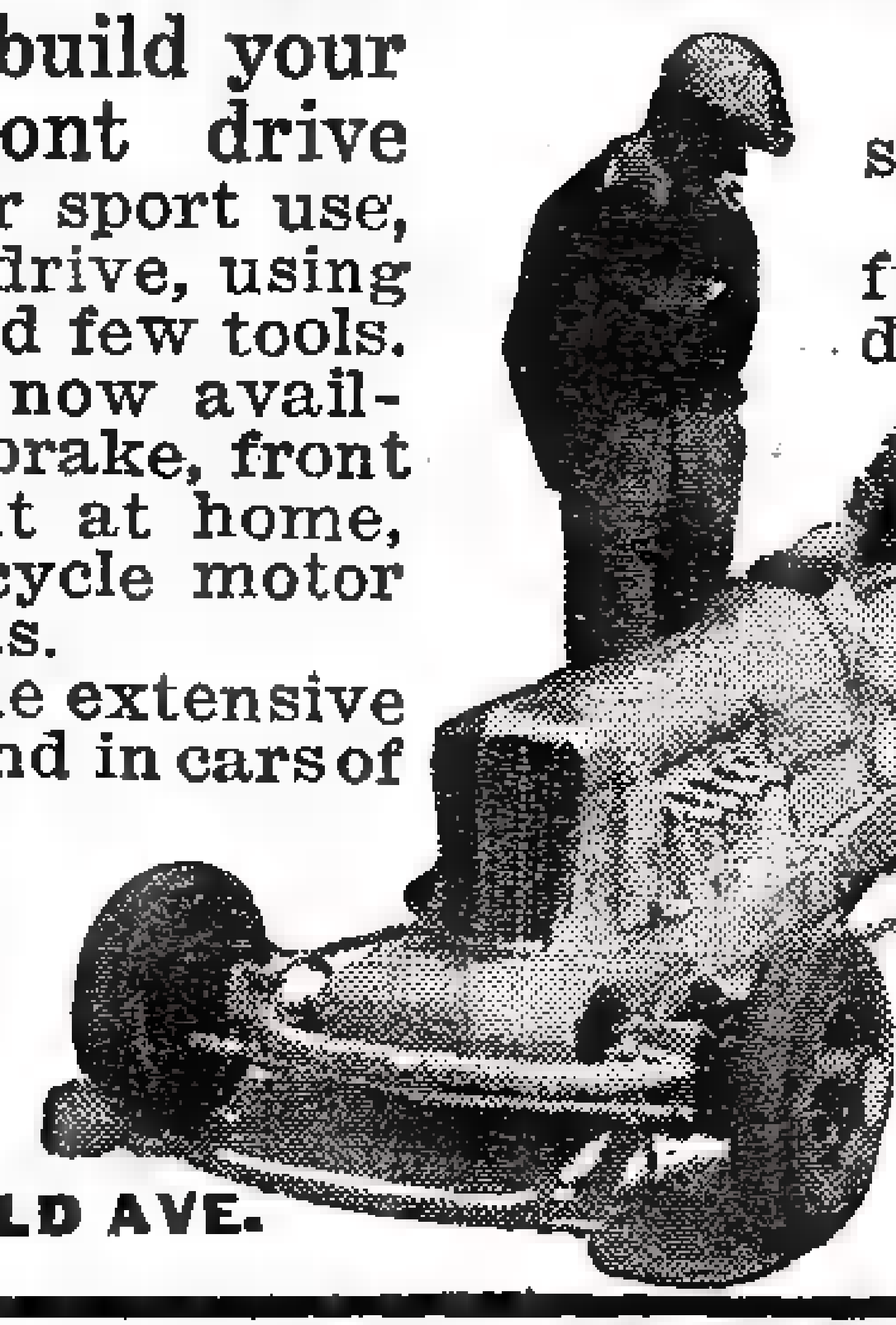

You can now build your own midget front drive auto, for racing or sport use, with the simplest drive, using "T" Ford parts and few tools. With the plans now available, this 4 wheel brake, front drive, can be built at home, using your motorcycle motor and other car parts. Made without the extensive machine work found in cars of this type, this "Silver Bullet" can be built by almost anyone and most economically.

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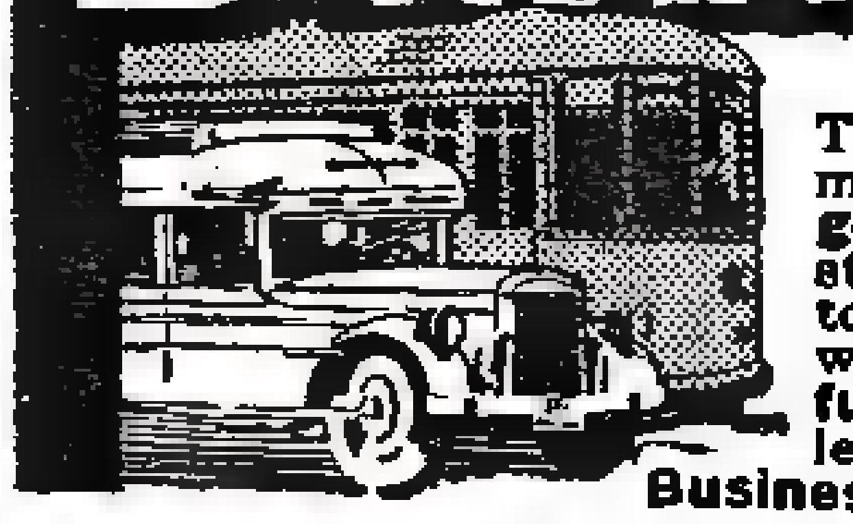

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C. E. Brooks, Inventor

Why worry and suffer with that rupture any longer? Learn about my perfected invention. It has brought ease, comfort and happiness to thousands by assisting in relieving and curing many cases of reducible hernia. It has Automatic Air Cushions which **bind and draw the broken parts together as you would a broken limb.** No obnoxious springs or pads. No salves or plasters. Durable, cheap. **Sent on trial** to prove it. Beware of imitations. Never sold in stores nor by agents. Write today for full information sent free in plain, sealed envelope.

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10
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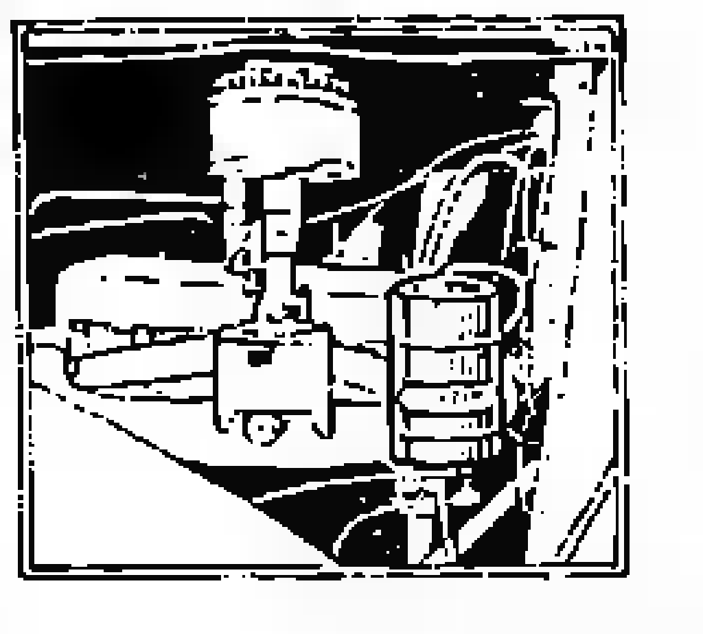
Name______________________________________

Address____________________________________

City__________________________ State____________

Attach letter stating age, occupation and name and address of employer and at least one business man as reference.

NEW! Every Motorist Needs AUTO-RECLAIMO



a filter and re-refiner combined. Easily attached to exhaust manifold of cars and trucks. No more oil changes. Removes solids, water—prevents dilution and acid formation. Saves 80% of motor wear. Our commercial size reclaims oil at 4c per gallon.

Write for free particulars. Agents Wanted.

M. SCHWALGE CO., 2510 Flournoy St., Chicago, Ill.

30 Days Trial!

NOW! you can ride a genuine Mead bicycle 30 days without "buying for keeps." Return it at our expense if not satisfied. Write quick for FREE color Catalog, marvelous new prices, special offers. SAVE ⅓ buying direct from MEAD!

The RANGER "ACE"

$19.95

Mead's Sentinel bike only $19.95—Rangers a few dollars more. America's finest quality bicycles at rock-bottom prices.

RIDER AGENTS WANTED

Ride and exhibit sample of our new Balloon-Tire RANGER, and make money. Opportunity of lifetime. Special Offers on our entire line of quality bicycles—[illegible] you hurry! Send no money—write.

TIRES —Save One-Half on lamps, wheels, tires, equipment. Drop us a postal.

Mead CYCLE COMPANY
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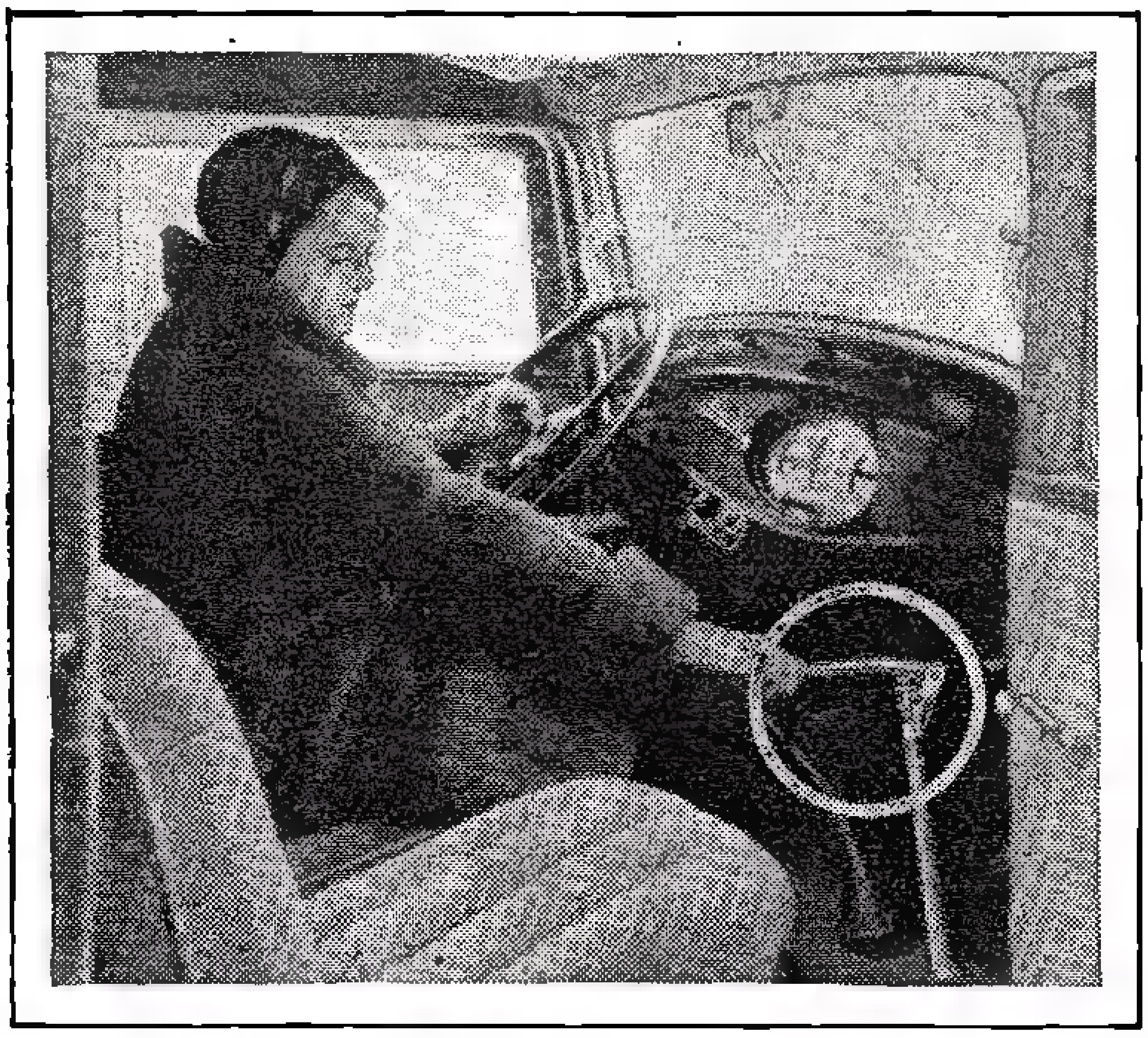
FREE! Great new Color Catalog, sent FREE. Hurry!

NEW PRODUCTS BRING NEW BUSINESS



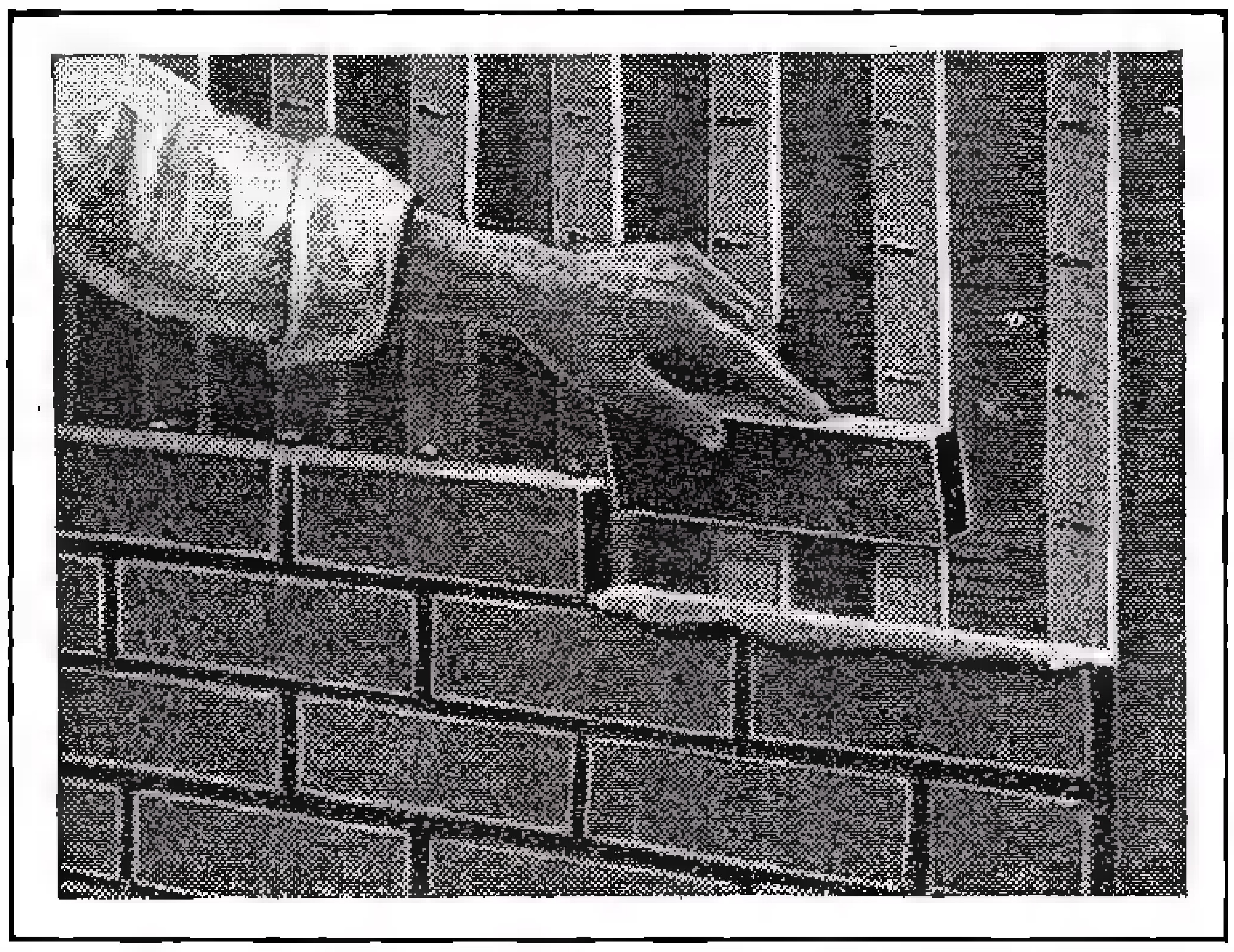
Designed especially for women drivers who have difficulty in releasing pushbutton type emergency brake on autos, new extension handle brings brake lever closer to driver, where it can be set or released quickly with little effort.

Listening in with headphones on any radio set is made easy by a tiny adapter unit having terminals for the phones, a clip to be grounded to the radio chassis, and a thin wafer which slips over the plate prong of the power amplifier tube.

A tip-up machine for ice fishing, made of aluminum and steel, holds the spare line on a reel under water where it will not freeze, automatically raises a flag to indicate a strike.

Latest in home heating equipment is the invisible radiator, built into the walls of the home. It can be completely plastered over or built with two small grilles showing.

Fluorescent theatrical make-up coming in a wide range of colors makes hands and faces of actors glow brilliantly under invisible ultra-violet illumination. The make-up, coming in a harmless toilet preparation, is scarcely visible in ordinary light.



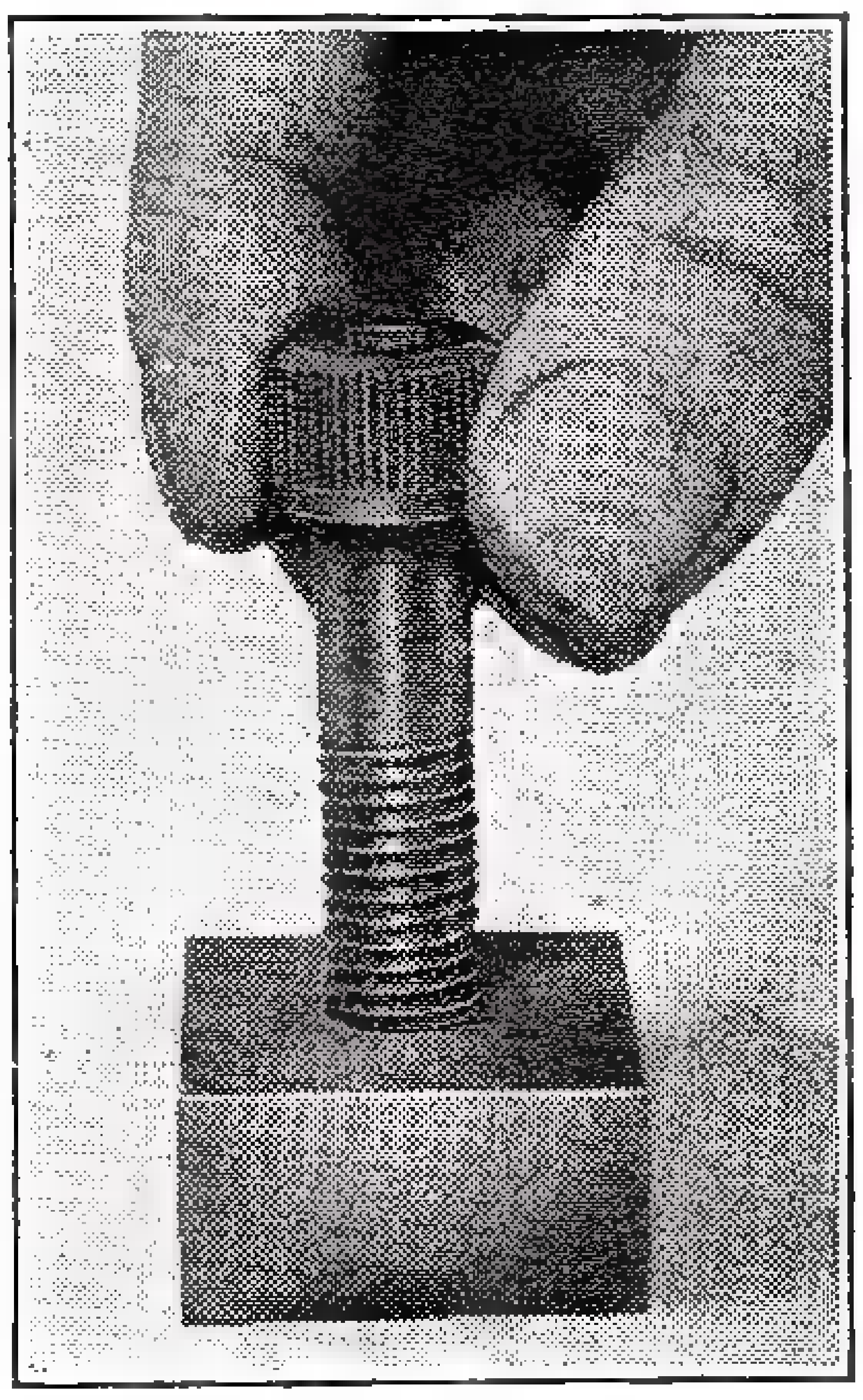
New building bricks installed like shingles modernize old frame buildings at low cost. Cypress lathing is nailed over building paper, then studded with steel staples to hold ¾" thick bricks in place. Mortar fills spaces between bricks.

A gleaming enamel cover fitting over the exposed cooling mechanism of the older electric refrigerators improves their appearance and increases the air draft through the cooling coils.

A new window glass made with an air space between two layers of clear glass prevents formation of frost on panes in winter, and saves about 60% of the heat ordinarily lost through a window.

Carbon-arc health lamp unit screws into any electric room heater; with one carbon infra-red rays are obtained—with two, ultra-violet. The arc automatically goes out after operating from 6 to 8 minutes, to prevent over-exposure.

Perfect rounded corners for stairs and drawers are obtained by pressing a new three-cornered gadget into each corner. A serrated clip holds the spring-steel corner firmly in place.



Knurled head screw with hexagonal hole in head is quickly started with fingers, tightened with ordinary pair of pliers if socket-wrench is not handy.

A new type heat regulating thermostat for the home sets new comfort records, maintaining constant room temperature to within ¼ degree. Being independent of variations in temperature in different parts of the room, it may be mounted as near the floor as desired, or even back of furniture.

Piston-ring expansion joints for steam systems, operating in much the same manner as auto pistons, may be repacked under 200 lbs. steam pressure.

Cracked, weather-beaten airplane fabric is amazingly rejuvenated and stretched to its original tautness by a newly developed dope. The old finish does not have to be removed.

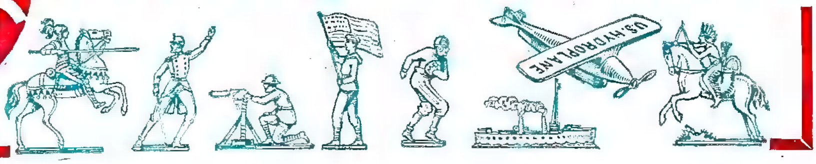
Money lockers in various sizes up to 700 pounds operate from any light socket, opening cash drawer 15 minutes after combination is set. Money is put in through trap doors at top.

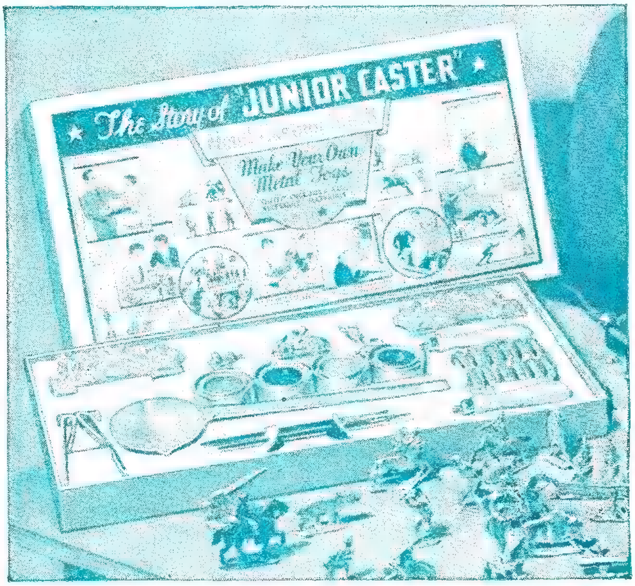
Electric fire alarm rings house door bell continually as soon as temperature near fuse element reaches 145 degrees F.

Editor's Note—Addresses of manufacturers of these and other new products in this issue can be obtained by sending a stamped, addressed envelope to MODERN MECHANIX AND INVENTIONS, *529 South 7th St., Minneapolis, Minn. Manufacturers and inventors are invited to submit photos and literature for this page.*

FREE 24 PAGE BOOK

FUN and PROFIT Casting Lead Toys





GET this complete outfit. Learn how metal castings are made. It's fun to cast lead soldiers, animals, airplanes and other metal figures. You can make all the toys you want. Junior Caster is a complete outfit for casting and coloring the largest, finest toys. You can also sell the toys you make at a big profit. Full details furnished in the 24-page illustrated book.

Fascinating! ***Educational!***

ONLY

Complete Outfit . . . $2.50

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JUNIOR CASTER

Each Junior Caster outfit comes in a large attractive box and includes a complete set of moulds for making 3 different figures thousands of times, also handles and clamp, large supply of lead, ladle, 4 cans of paint, and 2 brushes.

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Get a Junior Caster for Christmas. This fascinating outfit is chock full of fun and profit possibilities.

Junior Electric Caster, $3.25

A brand new De Luxe Outfit including all the regular equipment, and a special Electric Melting Ladle and Stand, designed for easy, rapid casting.

Insist on Genuine Junior Caster

Ask for Junior Caster at your dealers or send the coupon. For good casting results demand the original JUNIOR CASTER outfit. Avoid unsatisfactory imitations.

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It's easy to make fine toys with Junior Caster, like the ones you see in stores. You can sell them at a profit.

Make Over 200 Toys An Hour

It won't take long to make enough toys to pay for your Junior Caster Outfit, and make real profits.

Extra Moulds, 95c...Choice of 128 Subjects

All subjects can be made with one outfit, by simply buying extra moulds. Each mould makes 3 different, large figures. Choose from subjects such as Historical Figures, Sports and Athletics, Farm Subjects, Western, Wild Animals, U. S. Navy, U. S. Army, Continental Soldiers, and many others.

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Enclosed find money order for $........ Please send (Postpaid in U. S.) JUNIOR CASTER { Standard $2.50 / Electric 3.25
Check model wanted: ☐ Wild West Cowboys. ☐ U. S. Machine Gunners. ☐ U. S. Soldiers. ☐ Send FREE BOOK.

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JUNIOR CASTER

A man and his wife who had just returned from a round-the-world cruise spoke of Chesterfield as "an international cigarette."

It means something

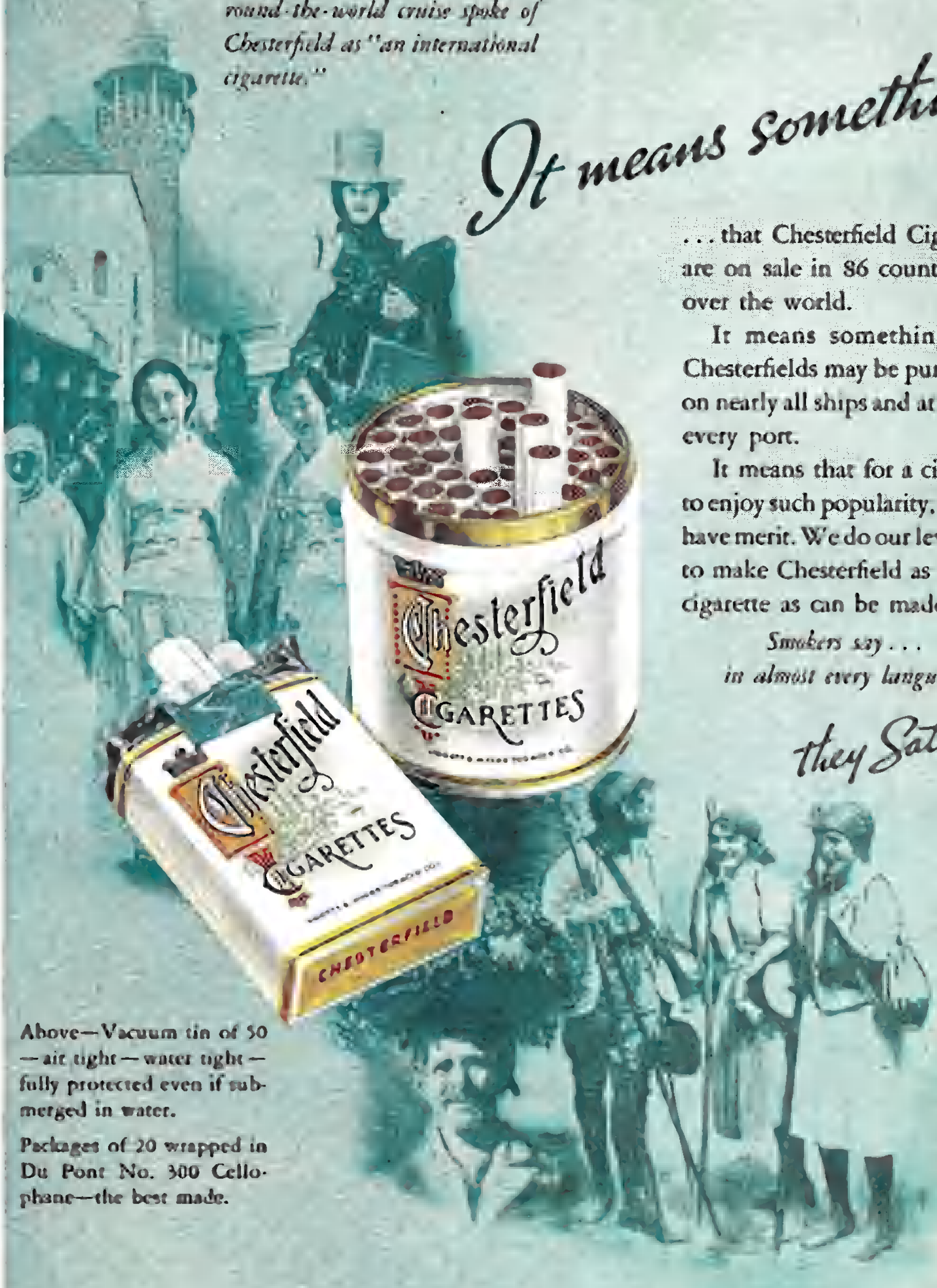
. . . that Chesterfield Cigarettes are on sale in 86 countries all over the world.

It means something that Chesterfields may be purchased on nearly all ships and at almost every port.

It means that for a cigarette to enjoy such popularity, it must have merit. We do our level best to make Chesterfield as good a cigarette as can be made.

Smokers say . . .
in almost every language

they Satisfy



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CIGARETTES
LIGGETT & MYERS TOBACCO CO.
Chesterfield
CIGARETTES
LIGGETT & MYERS TOBACCO CO.
CHESTERFIELD

Above—Vacuum tin of 50—air tight—water tight—fully protected even if submerged in water.

Packages of 20 wrapped in Du Pont No. 300 Cellophane—the best made.

© 1934, Liggett & Myers Tobacco Co.

Double Page Spreads

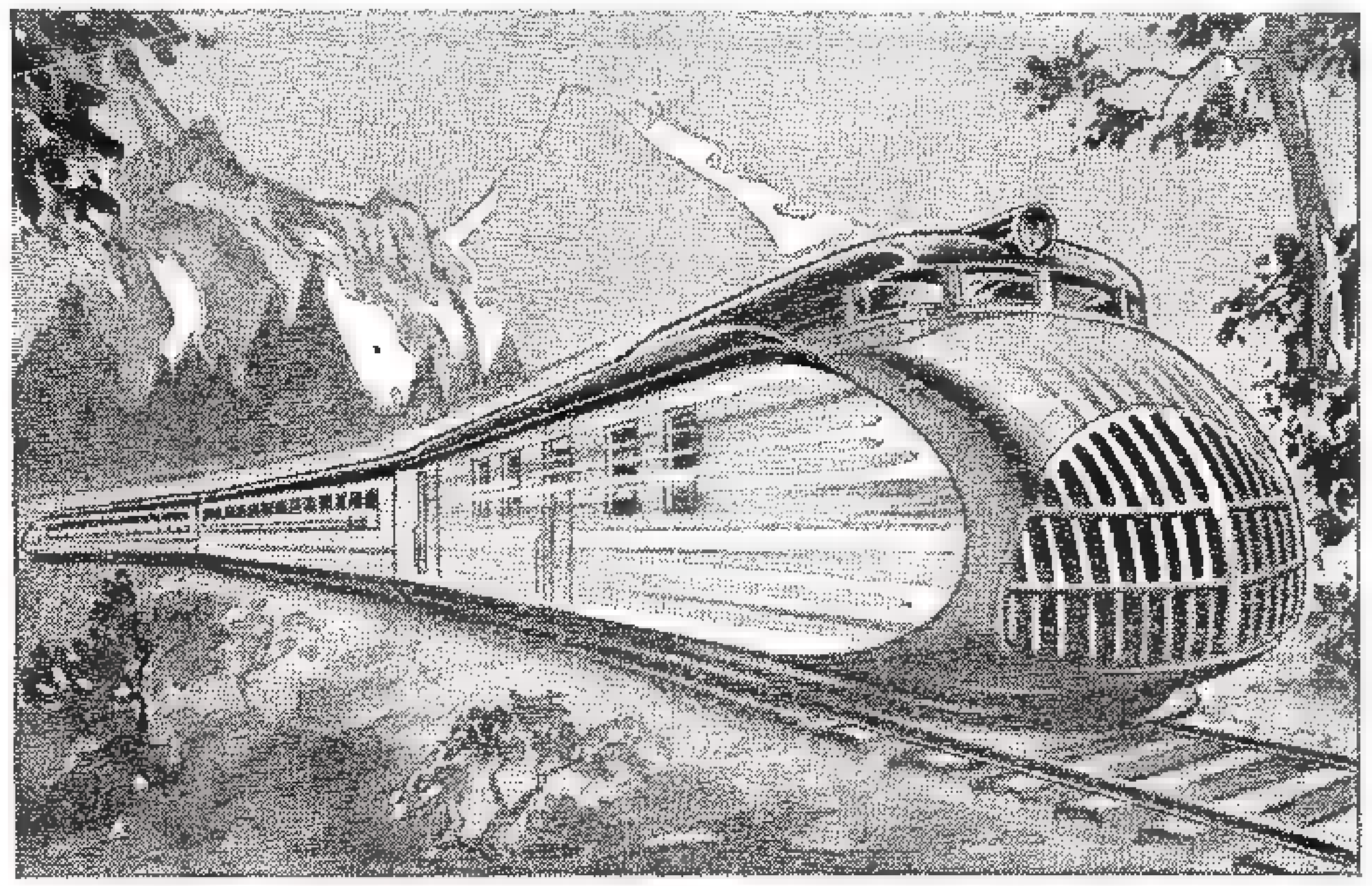
The Book Opposite Contains

48 PAGES OF FACTS FOR INVENTORS

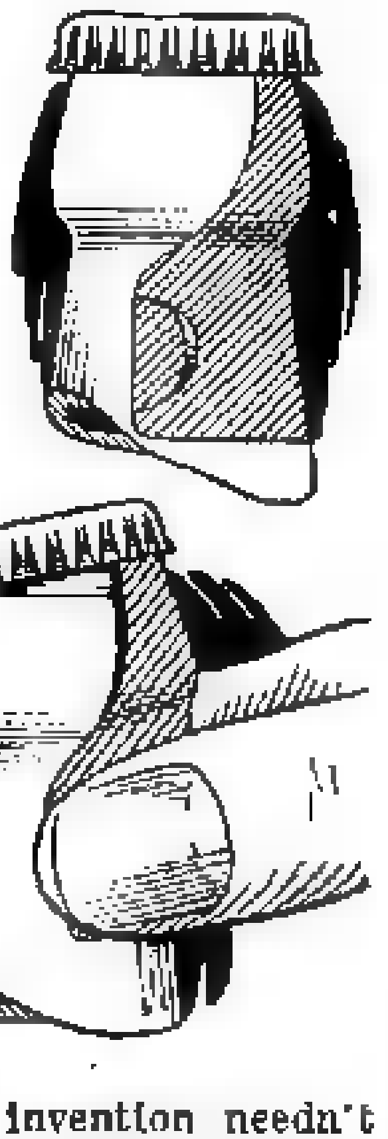
HAVE you an invention—or an idea for one—that will save time, save labor, make money or give pleasure? If you have, **this interesting, new FREE BOOK, was meant for you.** It's crammed full of practical, useful information that the man with an invention needs to know. Tells you facts like these: How the Patent Laws protect you and why, if you have an invention, you need a Patent at all; what a competent Patent Attorney can do for you; what kind of a sketch or model is needed; how to make a disclosure of your idea right away, to help establish your claims; **how some successful inventors have secured financial assistance;** tells about interesting inventions that have proved successful and shows you **115 different mechanical principles that inventors have used in working out ideas;** also gives much other information that every man who has an invention—large or small—can use to his advantage and profit. Read what the inventors below say about this book. Then, if you have an invention yourself—even though it is still in the rough or crude stages—write us for a copy. **Our business is to help you if we possibly can. You'll welcome a book of facts like this.**

The Big Age of Invention Is Still Ahead

Below is one of our newest trains. It's the crack, streamlined express of the Union Pacific. Does 110 miles an hour. The whole train weighs only as much as a single, modern steel pullman car. This is only a glimpse of what's ahead. Experts say that within the next ten years the railroads will have to be revolutionized. Henry Ford says that we're still living in the stage coach age. C. F. Kettering, Vice President of General Motors, says: **"We're only entering the great period of inventive advancement."** Look around you. Every line of industry, every sphere of life, presents opportunity to the inventor. Ten years from now, you'll see a different world; a world in which the inventor has made big changes, changes just as revolutionary as this streamlined train is today. Men who are poor today will be big financial successes a few years from now, because of inventions.



Many Little Ideas Have Big Commercial Possibilities



In contrast to the train below, a big development, look at this recent invention, which is so simple that the average person is prompted to say: "Now, why didn't I think of that myself?" This invention is nothing more than a little metal strip, curved to fit partially around the neck and under the cap of an ordinary ginger ale or beer bottle. When pulled out at the bottom, it forces off the cap, rendering a bottle opener unnecessary. A worth while improvement and the inventor has a patent. Simple, but it has in it the possibility of tremendous sales and profits. An invention needn't be complicated to be valuable. **Your first step, if you have an invention, is to get the facts about Patent Protection. We'll gladly supply them FREE to serious, interested men.**

WHAT INVENTORS SAY:

One inventor writes: "I want to compliment you on the publication of a book so replete with information naturally of great interest to inventors."

Another writes: "Your book sure is a wonderful guide for an inventor. I shall keep together the book and all references to have same on hand."

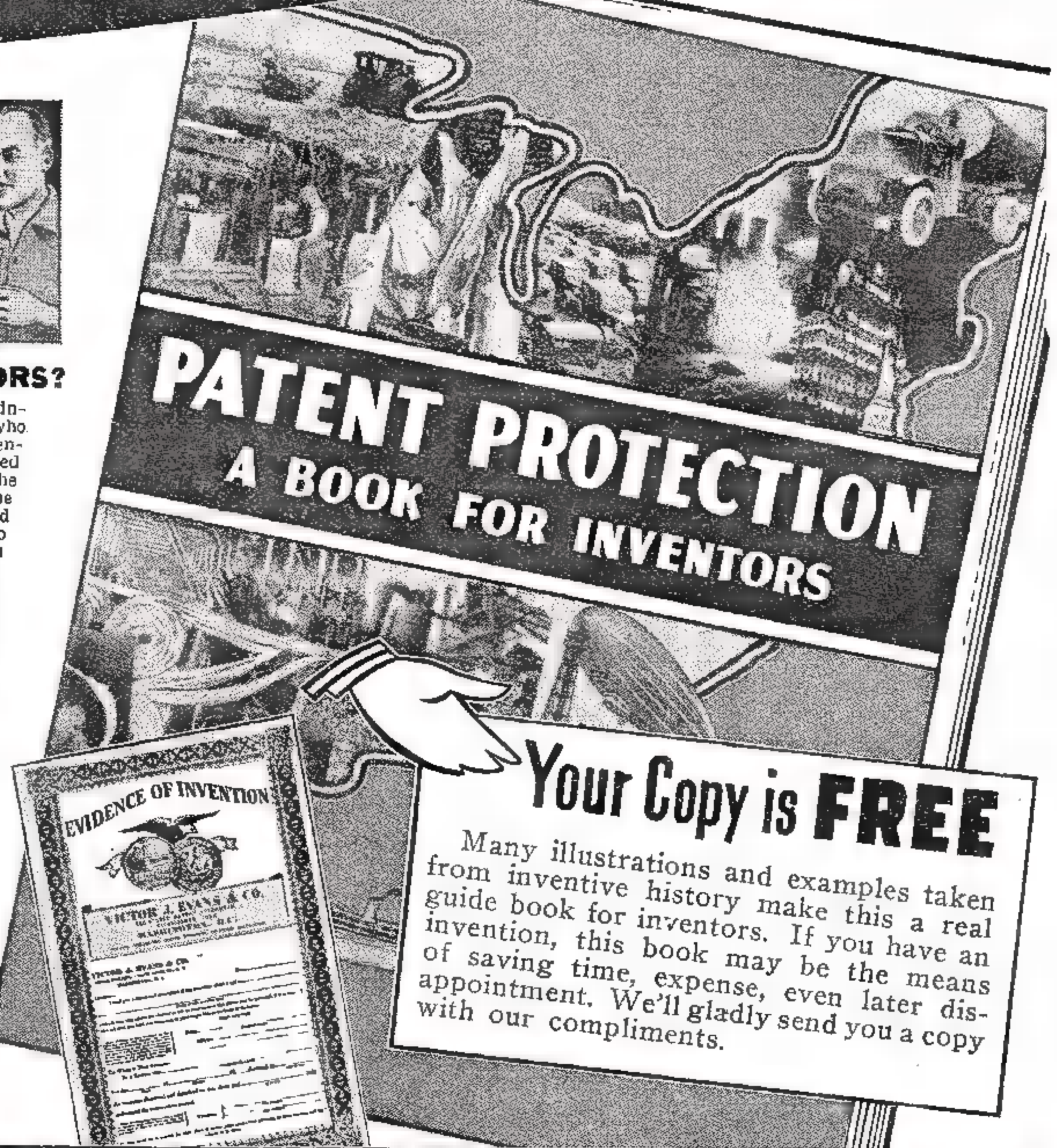
Still another man says: "I have read your book Patent Protection thoroughly and I feel sure that whenever the need of information arises I will know how to proceed in order to patent any device that I may happen to think of."

WHO ARE INVENTORS?

Some of the most successful inventions have come from men who didn't consider themselves inventors at all. A dentist invented the stock ticker; a bank clerk the hand camera; a school teacher the telephone, and a farmer invented the typewriter. No matter who you are or what you do, if you have an idea for an invention that will serve a useful purpose, you are entitled to your just reward and the Patent Laws are designed to protect the poor man and the rich man alike. But you must know how to take advantage of them. Our book will tell you how.

IMPORTANT

With the book, we will also send you a FREE copy of our "Evidence of Invention" form, on which you can make a sketch and description of your invention and establish a date of disclosure. Such a dated disclosure may later prove important to you. We send full instructions. **Any letters, sketches, drawings or models you send us are held in STRICTEST SECRECY by us. You can write us frankly. But first get a copy of this remarkable book.**



Your Copy is FREE

Many illustrations and examples taken from inventive history make this a real guide book for inventors. If you have an invention, this book may be the means of saving time, expense, even later disappointment. We'll gladly send you a copy with our compliments.

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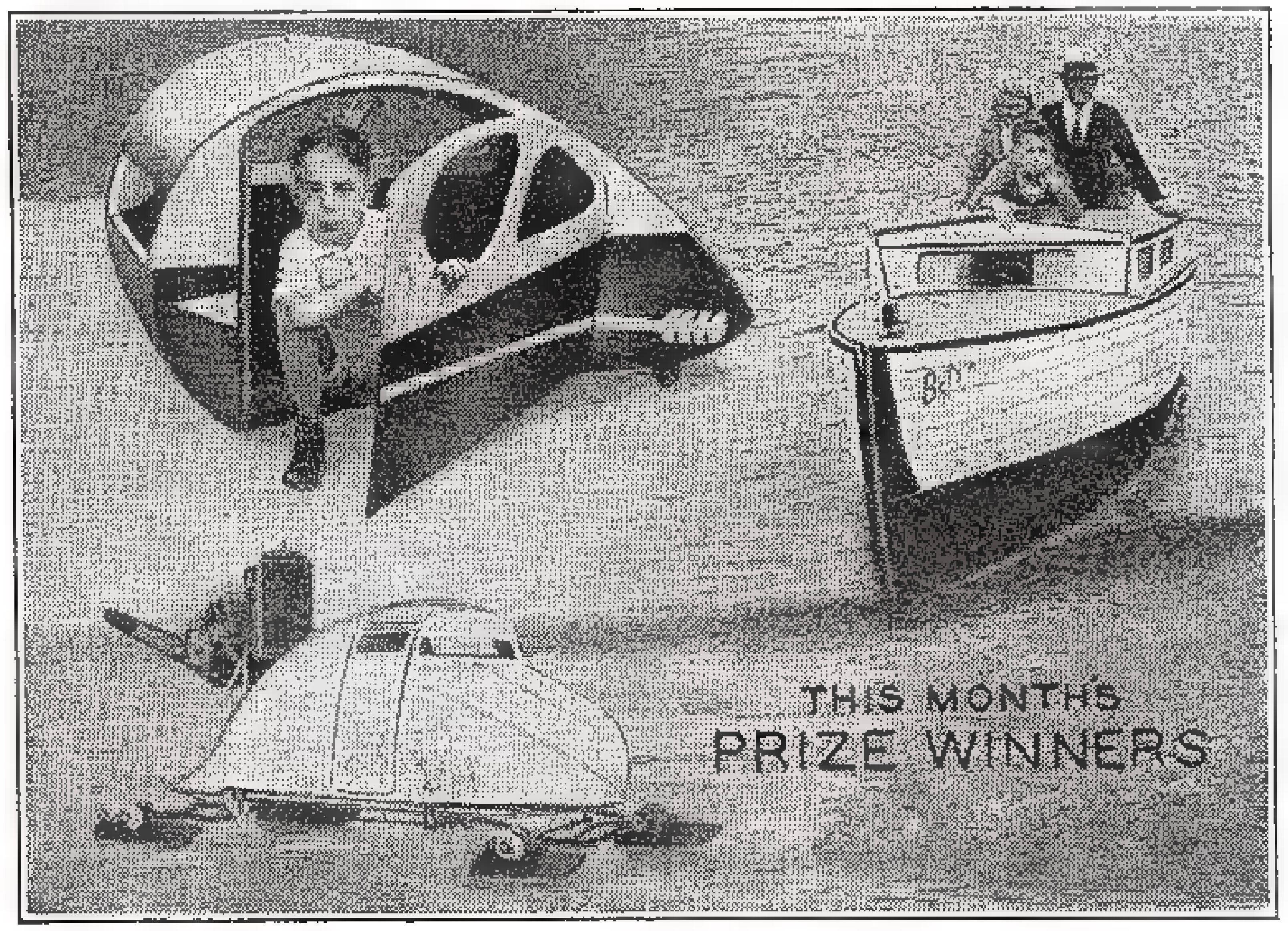
Kindly send me FREE and without obligation, a copy of your book, "Patent Protection," and the "Evidence of Invention" form.

Name ....

Street and No. ....

City or Town ....State..................

Random Chips from the Editor's Workbench



Jack G. Moody won first prize of $5.00 for the photo of his Scooter (top left). Second prize went to Jack B. Major for the Lark Jr. he built for $12. It is shown at right. The streamlined motor ice sled brought third prize to W. R. Davison.

Big $500 contests open to all MM readers. Here are some new members of MM's boat fleet. Scooter wins first prize in Workbench contest. MacRobertson, Australian millionaire, sends letter and photo.

EVERY shop fan, handy man, and home lover should enter MM's new $500 cash prize contests. We haven't room to discuss details here, but we know every one of you has a good chance of winning one of the 56 prizes. Announcement and rules for the first of a series of four contests can be found on page 46.

* * *

In the Workbench's own little contest, prizes this month were awarded to three good examples of fine workmanship. First prize of $5.00 goes to Jack G. Moody, the first reader to send in a photograph of the Scooter, which was explained in a how to build article in the August issue.

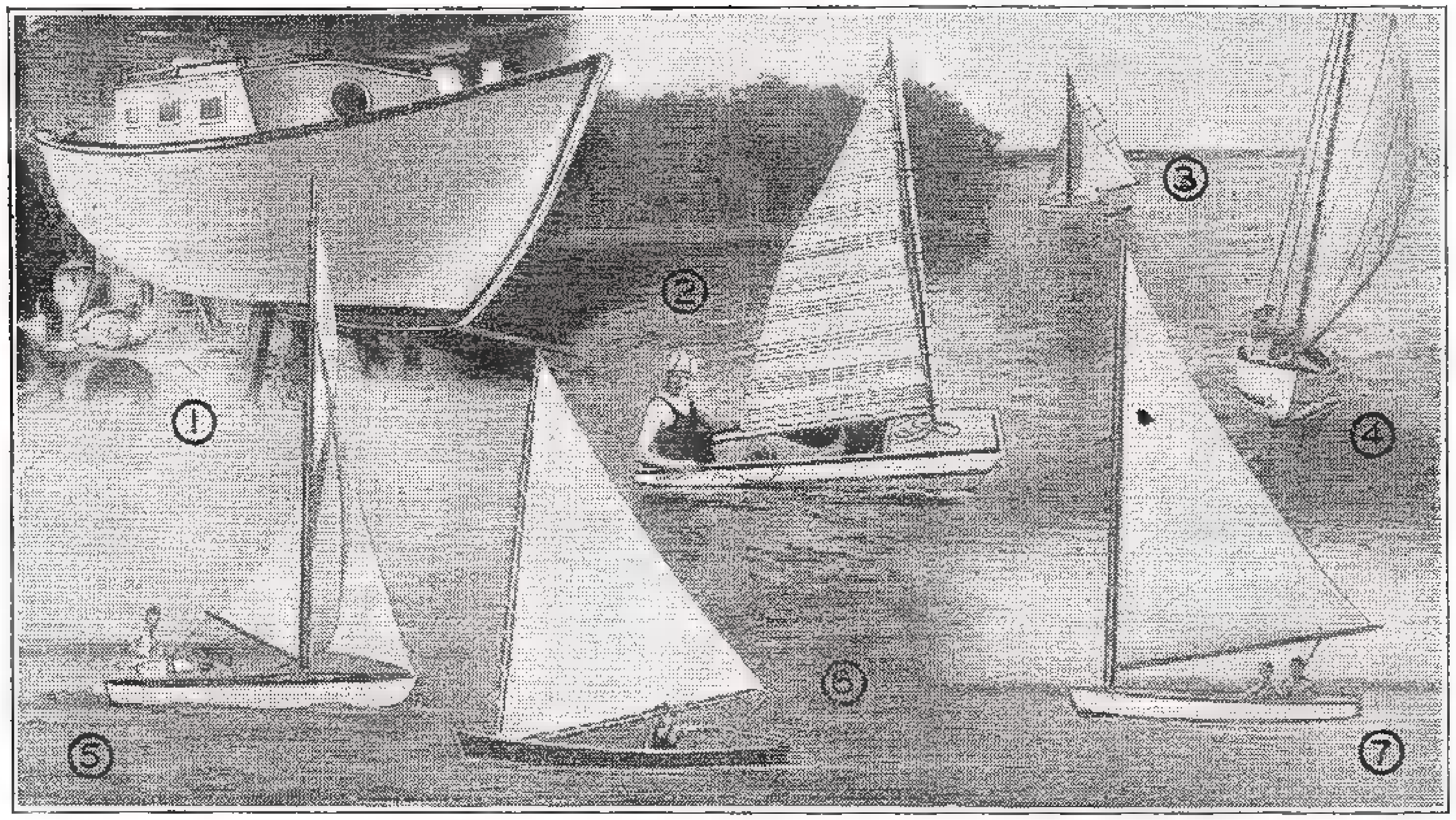
Moody says:

> Akron, O.
>
> Dear Editor:
>
> **The scooter, planned for the small boy next door, was built from the plans in the August M.M. It is painted silver and vermilion with a half inch black line separating the two colors. The arrows and striping were first cut from gummed paper, painted and then glued on, making a professional looking paint job. The construction cost amounted to only seventy-five cents. And is the little boy proud of it!**
>
> Jack G. Moody.

Another Jack, this time Jack B. Major, received second prize of $3.00 for his photo and letter. For $12 he built Lark Jr., the 13½-foot outboard motor powered cabin cruiser, plans for which appeared in the October, 1933, issue. Here's his letter:

> Little Rock, Ark.
>
> Dear Editor:
>
> **I am sending you some snaps of Lark Jr. I built it last spring. It shows you what a man can do with good old MM and twelve bucks. That is what it cost me less the motor. She will do eight to ten miles an hour right along.**
>
> Jack B. Major.

A letter from MacRobertson (above), Australia's cocoa magnate, complimented our Sept. MM story on the London-Melbourne air race he sponsored. Photo shows first prize.



MM's BOAT FLEET has these new members: 1. S. T. Dickinson's "Dorothy"; 2. Chas. H. Peer's "Sea Skeeter"; 3. L. R. Healy's "Sunray"; 4. Sergt. R. Glenn's "Tar Baby"; 5. Frank K. Owen's "Sunray"; 6. Fred Kahs' "All Sorts"; 7. Joseph Bus' "Monotype." Send your boat photos and join the fleet.

Blueprints for this midget cabin cruiser are now available for $2.00.

* * *

With the ice season right on our heels we couldn't resist giving third prize of $2.00 to Wallace R. Davison's excellent photo of his streamlined ice sled. He tells us:

> Minneapolis, Minn.
>
> Dear Editor:
>
> **I am sending you a picture of my streamlined ice sled which I built up out of an old Chev. chassis and reinforced with an X. It is powered with a supercharged Star motor and will do 60 miles an hour. Brakes, steering wheel, and spring mounted runners give the riders a floating ride with comfort and safety at all speeds. Wheels are interchangeable in place of the runners and it can be taken wherever I wish.**
>
> Wallace R. Davison.

* * *

MM's boat fleet continues to grow in numbers and popularity. Every month we receive several letters and photos from appreciative readers who have built and are pleased with MM's boats. A few of the photos are grouped in the composite picture above. If we had space we'd quote all enthusiastic letters. Here are some excerpts: Frank K. Owen, St. Paul, Minn., says about his "Sunray"—**"Had a great time sailing her. She handles very well."** Joseph Bus, Hamtramck, Mich., about his "Monotype"—**"It is easy to handle and will outsail anything with the same sail spread or length of hull."** S. T. Dickinson, Evanston, Ill., about his "Dorothy"—**"She is a dandy little job. Powered with a Universal Flexifour 20 h.p., she makes about 10½ m.p.h."** Charles H. Peer, Maplewood, N. J., about the "Sea Skeeter"—**"She has been on most every lake and stream in New Jersey. Every time we go on an outing Sea Skeeter is perched on top of old Lizzie and goes with us."** L. R. Healy, Yarmouth, Nova Scotia, about "Sunray"—**"Had a great deal of fun and pleasure building and sailing her and found your plans easy to follow."** Fred Kahs, Prince Bay, New York, about "All Sorts"—**"This was my first attempt at boat building."** Sergt. R. Glenn, Rizal, Philippine Islands, about "Tar Baby"—**"She sure is a honey. Rough water, surf and wind, she takes them all nicely."**

* * *

Every month the Workbench awards three prizes for the best photos, accompanied by interesting letters, of the models, furniture, radios, boats, etc., built by MM readers. What have you to offer?

Remember
EVEREADY
PRESTONE
THE PERFECT ANTI-FREEZE

SAME LOW PRICE!
$2.95
Per gallon

Play safe this year with
EVEREADY PRESTONE
THE GUARANTEED ANTI-FREEZE

One shot of Eveready Prestone... *put in now*... will keep your car safe. For every drop of Eveready Prestone is protection from both freeze-up and rust. At $2.95 a gallon Eveready Prestone is ALL ANTI-FREEZE... no water... no dilution of any kind.

Make the Nose Test: Eveready Prestone, truly non-evaporating, is odorless. But "boil-away" anti-freezes can always be identified by a noticeable odor. Regardless of special "treatments," claimed to decrease evaporation, they will evaporate rapidly when the engine runs at high speeds.

A SPECIFIC GUARANTEE

National Carbon Company, Inc., specifically guarantees that Eveready Prestone, used according to directions, will protect the cooling system of your car against freezing and clogging from rust formations for a whole Winter; also that it will not boil away, will not cause any damage to car finish, or to the metal or rubber parts of the cooling system, and that it will not leak out of a cooling system tight enough to hold water. National Carbon Company, Inc., General Offices, New York, N. Y. Unit of Union Carbide UCC and Carbon Corporation.

IT'S ALL ANTI-FREEZE...NO WATER

BOILING HOT *on a cake of ice!*

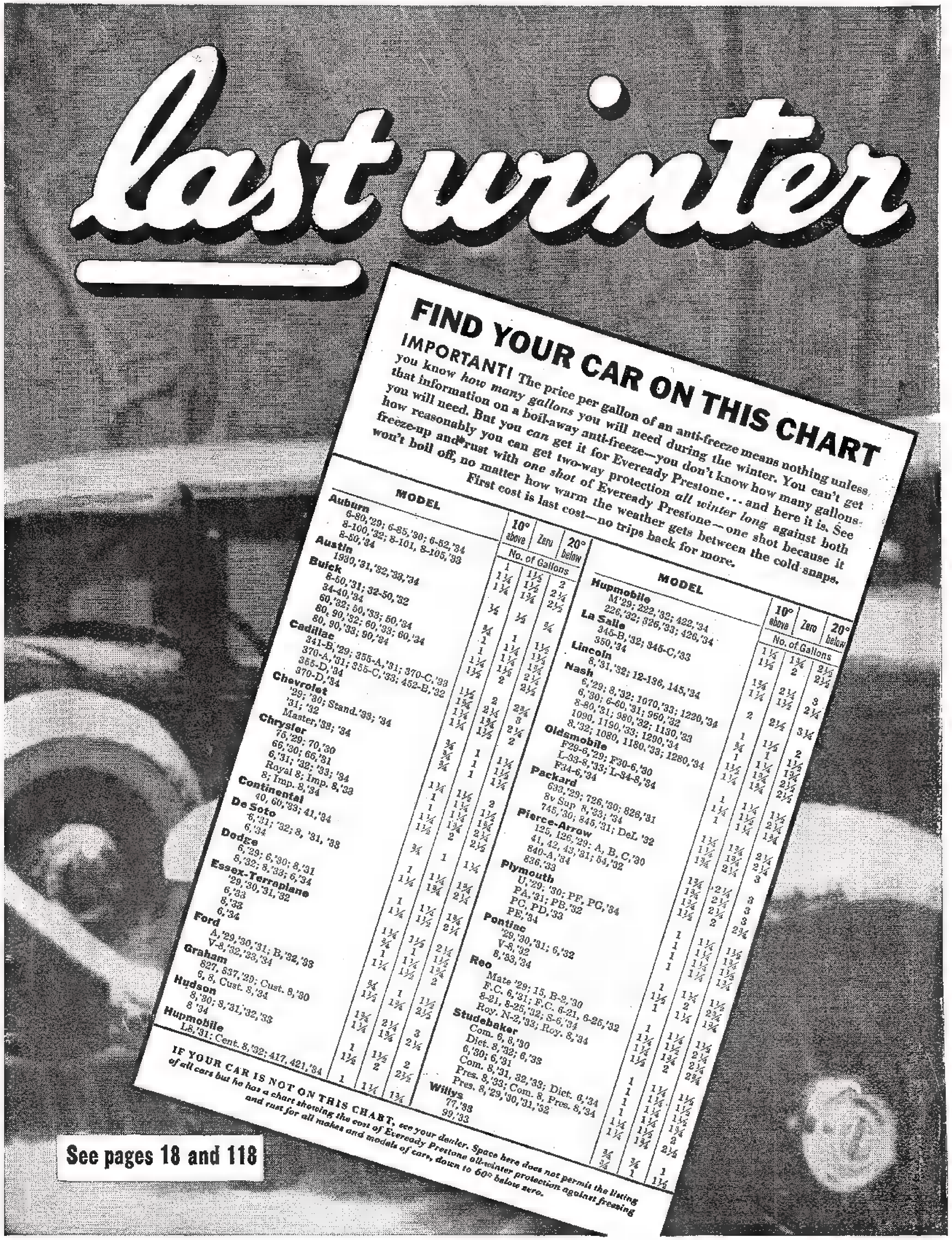
It seems like black magic to some, but—a pan of clear liquid will boil merrily if placed on a cake of ice. Of course, the liquid must have an extremely low boiling point, like liquid air, boiling at minus 318° Fahrenheit.

Apparent paradoxes of heat and cold are common. In Winter, if a motorist uses an anti-freeze with a boiling point lower than water, sooner or later it boils off. *Any* anti-freeze with that "boil-away" odor will boil off, regardless of special "treatments." Then, his car "freezes" . . . that is to say: Tiny particles of ice in the radiator-core clog the circulation and cause over-heating around the engine-head. Thus in *coldest* weather his car *boils* . . . boils away the anti-freeze, and badly damages the car with *heat.* Magic? No—carelessness!

A sure guarantee against such a dilemma is Eveready Prestone—the all-Winter concentrated anti-freeze. Don't confuse Eveready Prestone with either glycerine or alcohol. By actual tests it protects against rust from 5 to 20 times longer than other anti-freezes. It is undiluted, guaranteed one-shot protection, down to 60° below zero, if desired. Prevents "freeze-up," rust, and corrosion. It will not boil off, and is absolutely odorless.

Full protection so inexpensive!

Read the full guarantee above, and protection chart on the opposite page. Here you will see how inexpensively *your car* can have Eveready Prestone protection all Winter long.


last winter

FIND YOUR CAR ON THIS CHART

IMPORTANT! The price per gallon of an anti-freeze means nothing unless you know *how many gallons* you will need during the winter. You can't get that information on a boil-away anti-freeze—you don't know how many gallons you will need. But you *can* get it for Eveready Prestone... and here it is. See how reasonably you can get two-way protection *all winter long* against both freeze-up and rust with *one shot* of Eveready Prestone—one shot because it won't boil off, no matter how warm the weather gets between the cold snaps. First cost is last cost—no trips back for more.

MODEL	10° above	Zero	20° below
	No. of Gallons		
Auburn			
6-80,'29; 6-85,'30; 6-52,'34	1	1½	2
8-100,'32; 8-101, 8-105,'33	1¼	1½	2¼
8-50,'34	1¼	1¾	2½
Austin			
1930,'31,'32,'33,'34	½	½	¾
Buick			
8-50,'31; 32-50,'32	¾	1	1½
34-40,'34	1	1¼	1¼
60,'32; 50,'33; 50,'34	1	1¼	1¾
80, 90,'32; 60,'33; 60,'34	1¼	1½	2¼
80, 90,'33; 90,'34	1½	2	2½
Cadillac			
341-B,'29; 355-A,'31; 370-C,'33	1½	2	2¾
370-A,'31; 355-C,'33; 452-B,'32	1¾	2¼	3
355-D,'34	1¼	1¾	2¼
370-D,'34	1¼	1½	2
Chevrolet			
'29; '30; Stand.'33; '34	¾	1	1¼
'31; '32	¾	1	1½
Master,'33; '34	¾	1	1¼
Chrysler			
75,'29; 70,'30	1¼	1½	2
66,'30; 66,'31	1	1¼	1½
6,'31; '32; '33; '34	1	1¼	1¾
Royal 8; Imp. 8,'33	1¼	1¾	2¼
8; Imp. 8,'34	1½	2	2½
Continental			
40, 60,'33; 41,'34	¾	1	1¼
De Soto			
6,'31; '32; 8, '31, '33	1	1¼	1¾
6,'34	1¼	1¾	2¼
Dodge			
6,'29; 6,'30; 8,'31	1	1¼	1¾
8,'32; 8,'33; 6,'34	1¼	1½	2¼
Essex-Terraplane			
'29,'30,'31,'32	1¼	1½	2¼
6,'33	¾	1	1½
8,'33	1	1¼	1¾
6,'34	1¼	1½	2
Ford			
A,'29,'30,'31; B,'32,'33	¾	1	1½
V-8,'32,'33,'34	1½	1¾	2½
Graham			
827, 837,'29; Cust. 8,'30	1¾	2¼	3
6, 8, Cust. 8,'34	1¼	1¾	2¼
Hudson			
8,'30; 8,'31,'32,'33	1	1½	2
8 '34	1½	2	2½
Hupmobile			
L8,'31; Cent. 8,'32; 417, 421,'34	1	1¼	1¾
M'29; 222,'32; 422,'34	1¼	1¾	2½
226,'32; 326,'33; 426,'34	1½	2	2½
La Salle			
345-B,'32; 345-C,'33	1¾	2¼	3
350,'34	1¼	1½	2¼
Lincoln			
8,'31,'32; 12-136, 145,'34	2	2¼	3¼
Nash			
6,'29; 8,'32; 1070,'33; 1220,'34	1	1½	2
6,'30; 6-60,'31; 960,'32	¾	1	1½
8-80,'31; 980,'32; 1130,'33	1	1¼	1¾
1090, 1190,'33; 1290,'34	1½	1¾	2½
8,'32; 1080, 1180,'33; 1280,'34	1¼	1¾	2½
Oldsmobile			
F29-6,'29; F30-6,'30	1	1¼	1½
L-33-8,'33; L-34-8,'34	1¼	1½	2¼
F34-6,'34	1	1¼	1¾
Packard			
633,'29; 726,'30; 826,'31	1¼	1¾	2¼
8v Sup 8,'33; '34	1¼	1¾	2¼
745,'30; 845,'31; DeL '32	1¾	2¼	3
Pierce-Arrow			
125, 126,'29; A, B, C,'30	1¾	2¼	3
41, 42, 43,'31; 54,'32	1¾	2¼	3
840-A,'34	1¾	2¼	3
836,'33	1½	2	2¾
Plymouth			
U,'29; '30; PF, PG,'34	1	1¼	1½
PA,'31; PB,'32	1	1¼	1¾
PC, PD,'33	1	1¼	1½
PE,'34	1	1¼	1¾
Pontiac			
'29,'30,'31; 6,'32	1	1¼	1½
V-8,'32	1½	2	2¾
8,'33,'34	1	1¼	1¾
Reo			
Mate '29; 15, B-2,'30	1	1¼	1½
F.C. 6,'31; F.C. 6-21, 6-25,'32	1¼	1½	2¼
8-21, 8-25,'32; S-6,'34	1¼	1¾	2¼
Roy. N-2,'33; Roy. 8,'34	1½	2	2¾
Studebaker			
Com. 6, 8,'30	1	1¼	1½
Dict. 8,'32; 6,'33	1	1¼	1½
6,'30; 6,'31	1	1¼	1½
Com. 8,'31, 32,'33; Dict. 6,'34	1	1¼	1¾
Pres. 8,'33; Com. 8, Pres. 8,'34	1¼	1½	2
Pres. 8,'29,'30,'31,'32	1¼	1¾	2½
Willys			
77,'33	¾	¾	1
99,'33	¾	1	1½

IF YOUR CAR IS NOT ON THIS CHART, *see your dealer. Space here does not permit the listing of all cars but he has a chart showing the cost of Eveready Prestone all-winter protection against freezing and rust for all makes and models of cars, down to 60° below zero.*

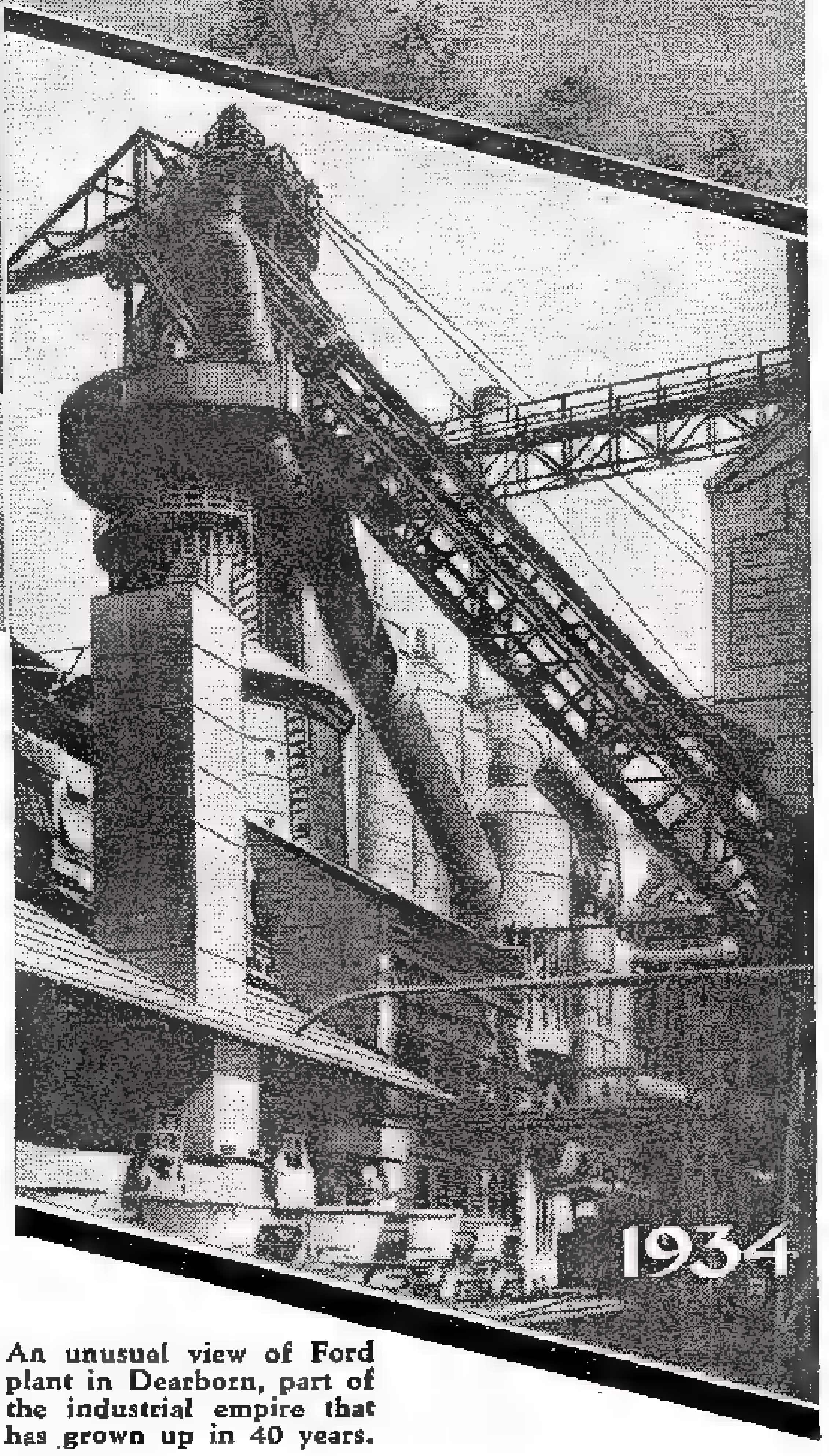
See pages 18 and 118

HENRY FORD *Discusses America's* INDUSTRIAL FUTURE

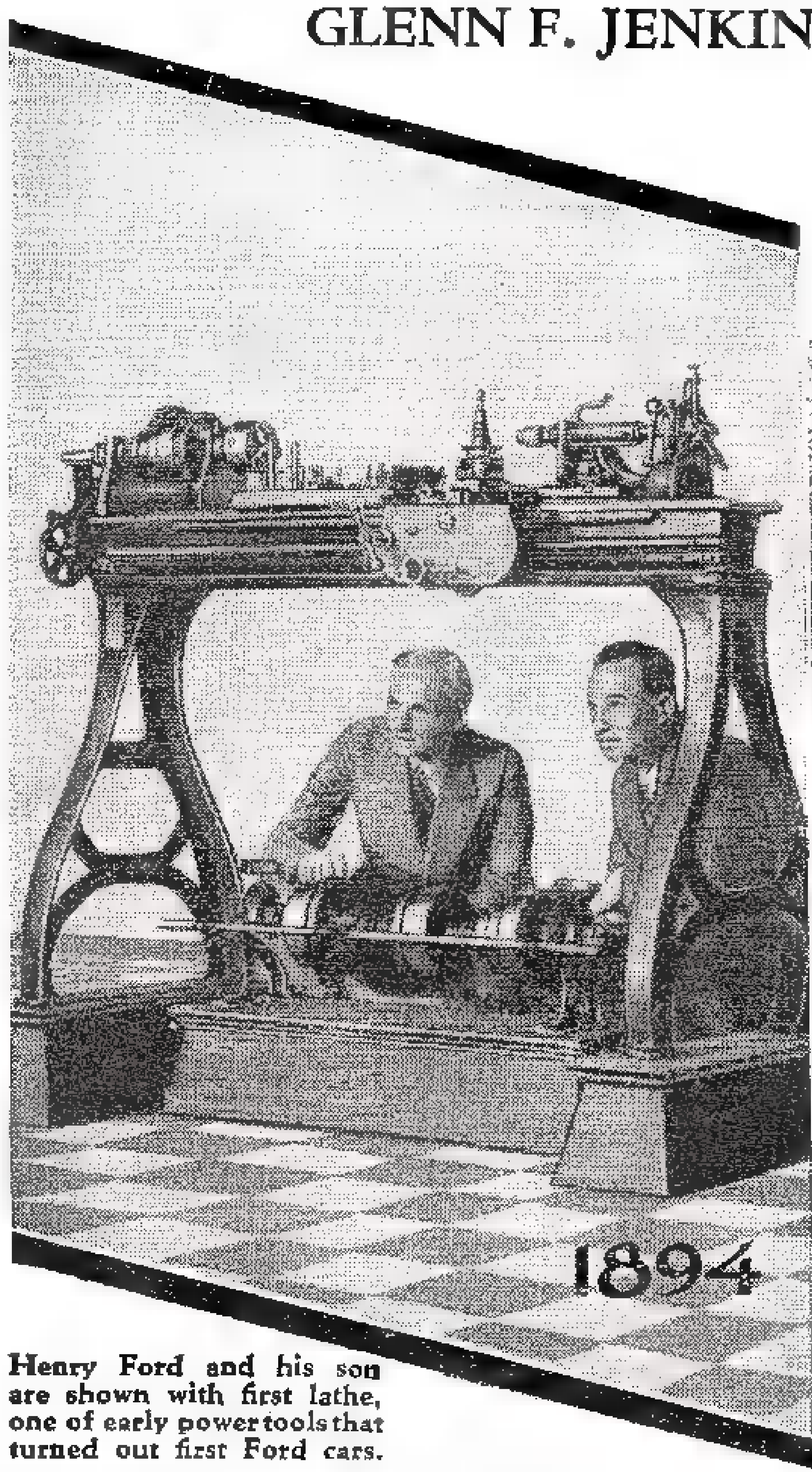
In this exclusive interview Henry Ford predicts that the farm will be the scene of industrial development. He points the way to success for today's inventors and looks upon chemistry as the link between a more prosperous agriculture and industry.

by
GLENN F. JENKINS

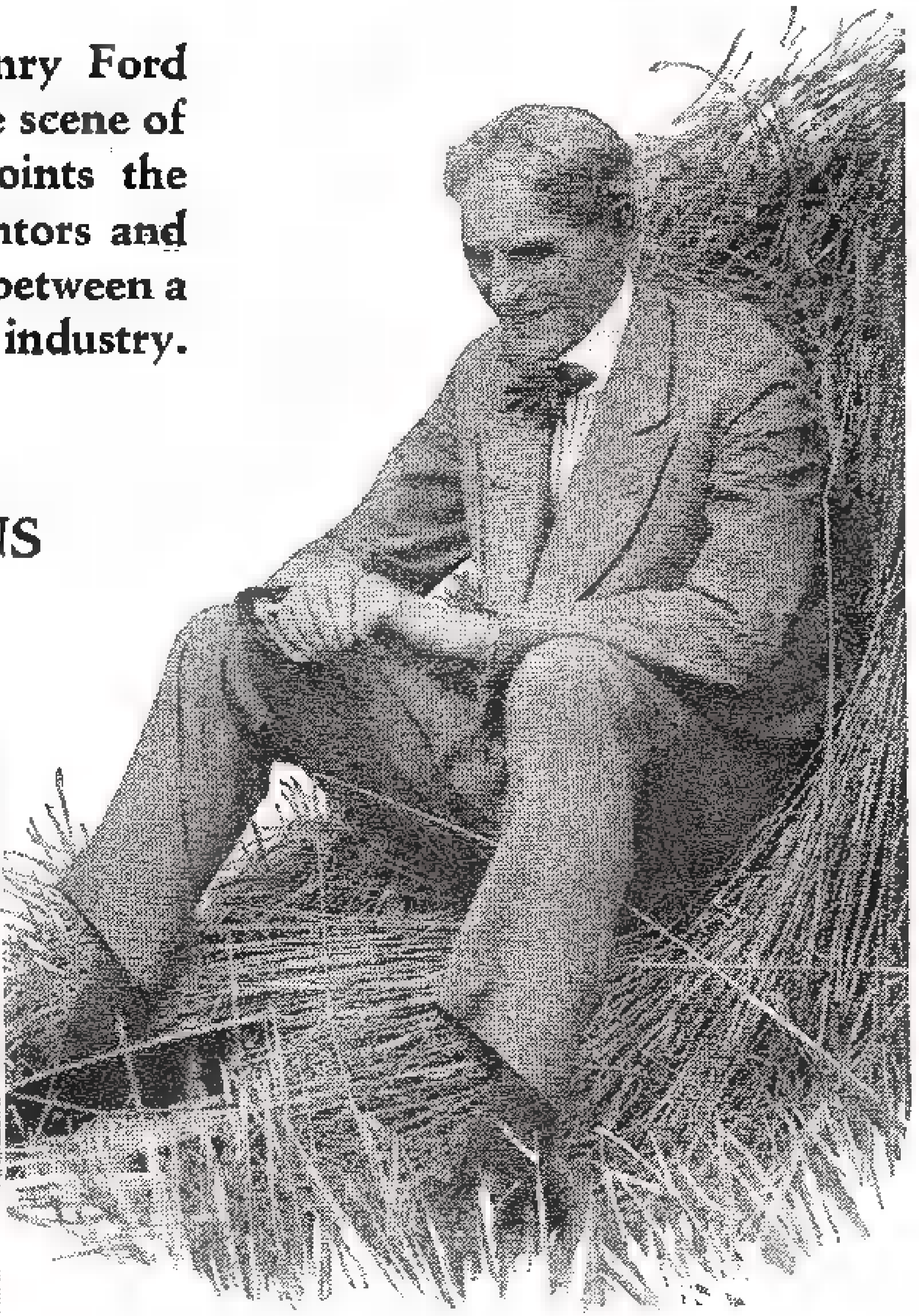
Henry Ford (left) and his son, Edsel, are shown above on top of the administration building overlooking the River Rouge plant, the heart of Ford's automobile industry.



An unusual view of Ford plant in Dearborn, part of the industrial empire that has grown up in 40 years.



Henry Ford and his son are shown with first lathe, one of early power tools that turned out first Ford cars.



This informal picture of Henry Ford resting in a field recalls his statement: "I have never worked so hard on anything as on the problem of reuniting farm and factory."

HENRY FORD, the industrial genius of modern times, sees industry entering a vast, wide-open era of experiment, invention and discovery. He believes that in the next twenty-five years man will achieve results overshadowing the dreams of today.

This new trend has already begun under the stimulation of Henry Ford's inventive mind. He is convinced that the farm will be the scene of great industrial development and that chemistry will be the agency by which these changes will be evolved.

A start has been made in this direction. Science is discovering means of transforming products of the farm into materials for manufacture. Through his experimental farms, Henry Ford now successfully con-
v automobile
p 30 per cent
o
astic indus-
t agriculture,
s possibilities
. As an ex-
laboratories
an a tough,
rial which
ids without
breaking.

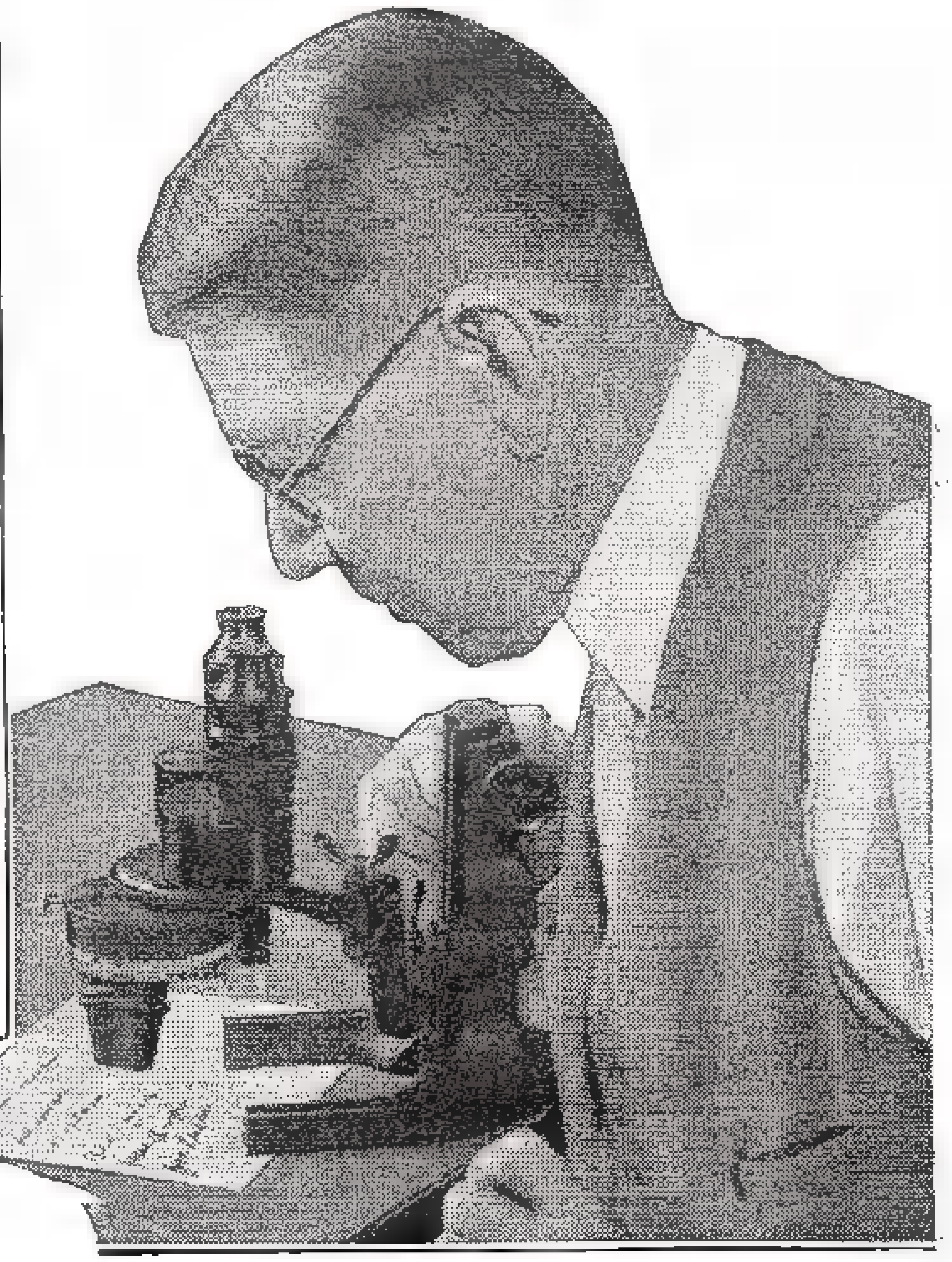
This material is as light as wood and some day may be as hard as steel. The ways in which this new Ford material may be employed are almost unbelievable. It has been developed to the point where it could be successfully used in making desks, chairs, and other furniture now in daily use. Ford and his chemists envision the time when automobile bodies, houses, skyscrapers and even great monuments may be fabricated from the soy bean.

Those who have the urge to create, to invent and to discover need not be bewildered by this picture of the future. Mr. Ford hastens to explain that there is nothing complicated about the new technique. It is based on formulas that are not too complicated. The soy bean, for instance, contains fats, carbohydrates, and proteins. By a simple process of chemistry these are separated. The fat, or oil, is used for paints, lacquers, food stuffs, and countless other things. The protein or bean meal becomes the plastic raw material which can be shaped to suit many purposes. The molding technique, within easy reach of the ambitious experimenter, is not complicated and calls for only 2,000 pounds pressure and 350 degrees Fahrenheit.

But what of the unknown inventor? How does he fit into such a picture, Mr. Ford was asked. Things are done on such grand scales nowadays. Great laboratories have been built to solve the problems of mankind. In them are the polished minds of the schools. Brains have been regimented. Has the individual been hopelessly submerged? To this Mr. Ford gives an emphatic denial.

Genius, coupled with a desire to create something, to lessen drudgery and improve our modes of living, need not look far, according to Mr. Ford. He may start from

How SCIENCE TRAPPED *Lindbergh Kidnap Suspect*



Above—Albert Osborn, handwriting expert who, after study of ransom notes and Hauptmann's writing, declared both were written by the same man. Right—B. C. Farrar, a government expert who, before Hauptmann's arrest, said the writer was a German carpenter.

by PETER LEVINS

NEVER has science played a larger part in a criminal investigation than in the Lindbergh kidnaping case. From the very night that Charles A. Lindbergh, Jr., was stolen from his crib in Hopewell, N. J., the best scientific brains of the nation have been at work on the meagre clues left by the murderer.

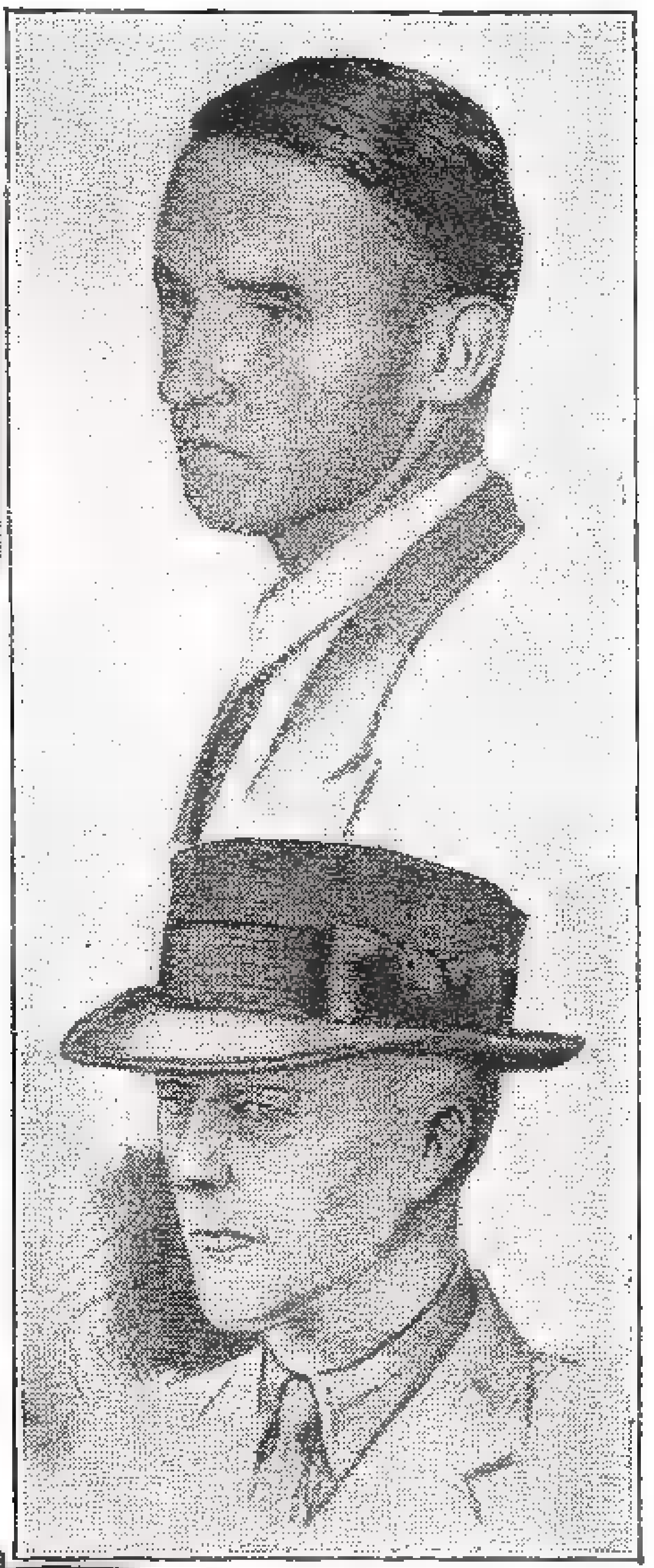
Investigators simply had to call in the laboratory experts. The clues were so few that ordinary police work would not avail. All the authorities had as evidence were the ladder used by the kidnaper to reach the nursery; the carpenter's chisel found near the ladder on the Lindbergh estate; the ransom notes; and, finally, the ransom bills that turned up in New York and vicinity.

Every known device of science was used to reproduce, from this scanty evidence, the figure of the mysterious "John the Kidnaper." That he was reproduced to a most startling degree constitutes a real triumph in modern detective work. The ransom money finally led to Bruno Richard Hauptmann, German carpenter. It is not at all unlikely even if the ransom money had not led to this suspect, police would have been able to seize the kidnaper through the scientific evidence gathered from the ladder, ransom notes and money.

Before Hauptmann was arrested police had a good picture of the man suspected of the kidnaping. As a result of researches of scientists, they knew their man was a carpenter and a German who probably lived in the Bronx. They knew that the person, who had the ransom money, had buried or hidden it. Even the general features of the man were known through a composite picture drawn by an artist in the Department of Justice from descriptions gathered from scientists and from Dr. John (Jafsie) Condon, the intermediary who delivered $50,000 to the kidnaper in a New York cemetery.

The expert who tackled the seemingly impossible task of tracing the lumber used in the construction of the ladder was Arthur Koehler of the United States Forest Products Laboratory at Madison, Wis. Koehler is the leading man in the country in this line of work.

Purely by laboratory methods, combined with his own extensive knowledge of wood, he can find out as much about a piece of lumber as a medical expert can discover by an autopsy on a human body. His tests determine exactly in which forest a certain fragment of wood originated. His microscope picks out every single mark or indentation. He can tell whether a hammer used in a piece of work was worn on one side, or otherwise marked. He can distinguish every infinitesimal flaw in the cutting edge of a chisel or saw.



Above—keg of nails found in Hauptmann's garage. The nails are said to be similar to those used in the kidnaping ladder. Right—Photo of Hauptmann and below composite picture drawn before his arrest. Note the resemblance. Right below—Col. Lindbergh, with police guard, entering grand jury room.

He declares that every tool makes a mark as individual as a human fingerprint.

After studying the fibre of the wood used in the ladder, Koehler traced the wood to a particular forest in California. From the forest he traced it to the mill that cut it. And from the mill he traced it—though this final phase of the search took many months—to the National Millwork and Lumber Corp., White Plains Road, the Bronx, where, it later developed, Bruno Hauptmann had worked.

A major achievement, this. And done almost exclusively in the laboratory.

After Hauptmann's arrest Koehler set up a laboratory in New Jersey and set about tracing every stick of wood used in the construction of the suspect's garage, where so much of the ransom money was dug up by the police.

The ransom notes produced a mine of information when subjected to the examination of experts. Very early in the case, even before the child's body was found, B. C. Farrar, handwriting expert of the United States Treasury, told Colonel Lindbergh that the writer of the notes was a methodical German carpenter. The habit of combining words—"sleepingsuit," for instance—was

(Continued on page 140)

$500.00 CASH PRIZES for HOME Improvements

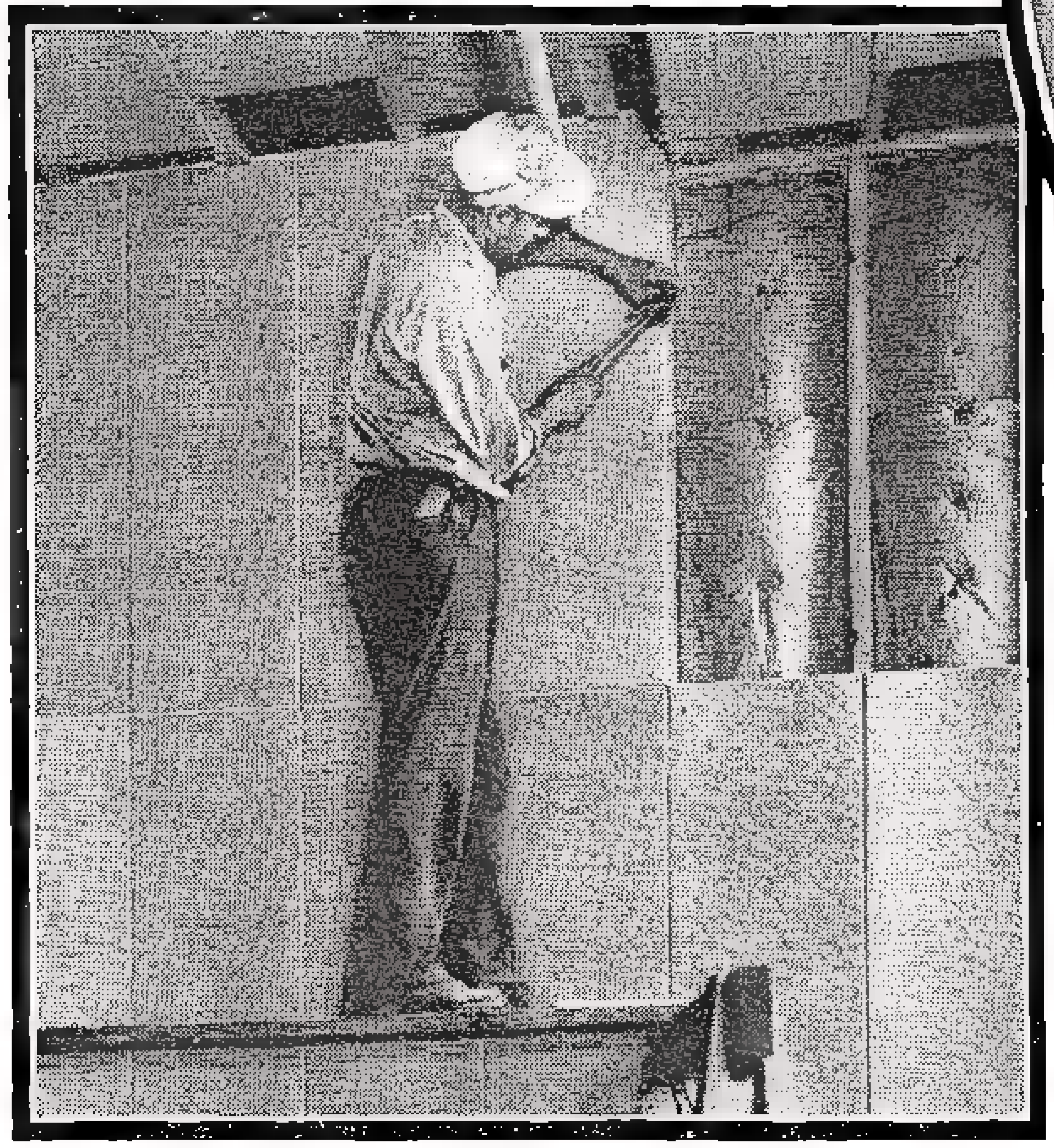
Fifty-six prizes, $500 in cash, await readers of Modern Mechanix and Inventions in a series of four monthly contests. Each contest will differ from the other. In each one 14 prizes totaling $125 will be awarded. In all four contests readers will have an opportunity to win 56 prizes or $500 in cash!

This month 14 prizes, totaling $125 in cash, will be awarded to the best suggestions received on improving a home. Tell as briefly as possible how you would convert an attic into a den, a porch into a sun parlor, an ordinary frame house into a colonial type home, or any one of dozens of possible improvements. You don't have to own a home to enter this contest.

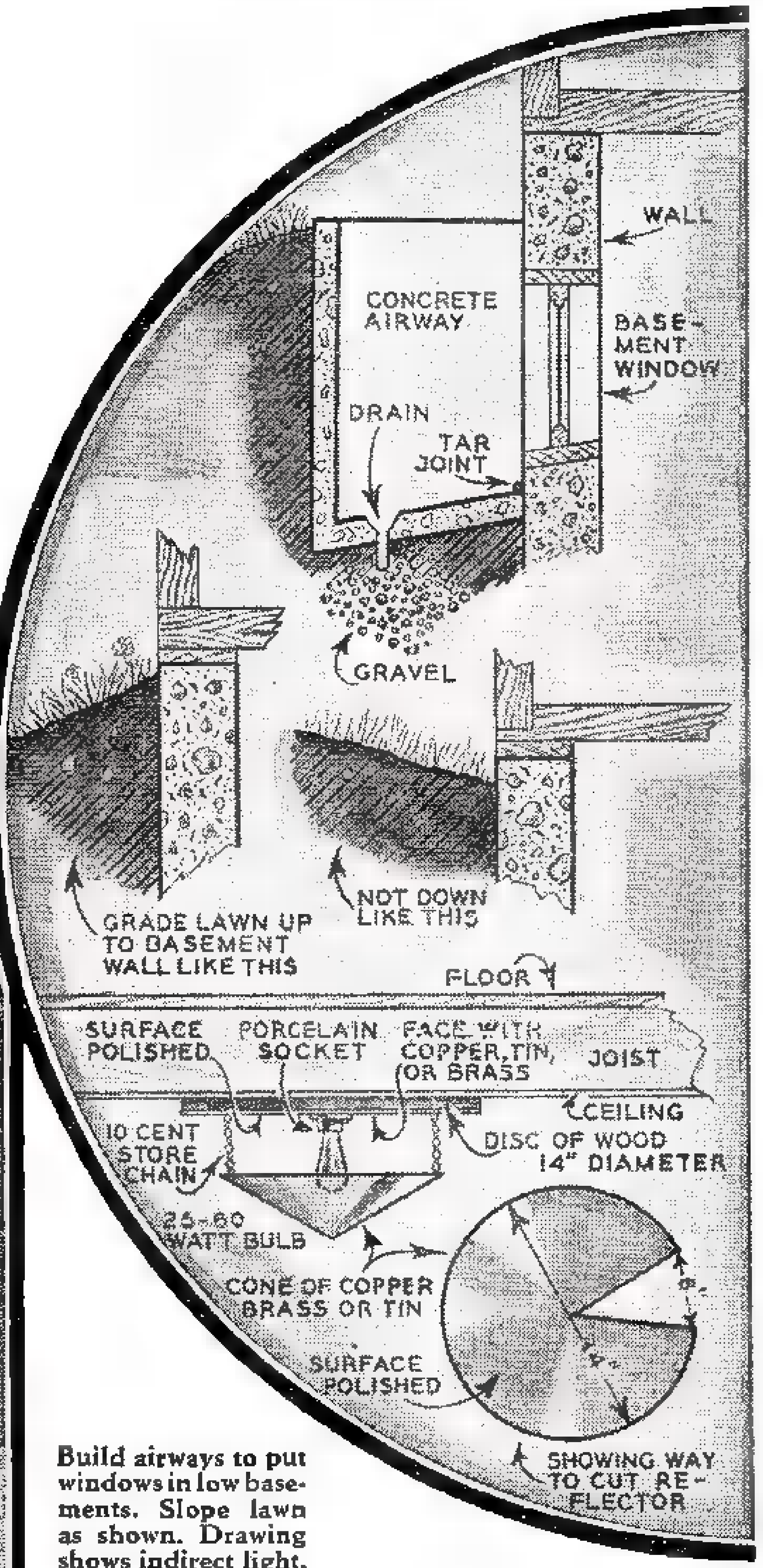
In your entry describe briefly how you would carry out the construction steps involved in remodeling some part of the house. You will find it easier to confine your entry to one section of the house, such as the porch, the attic, basement or roof. Read the rules on the next page. The following article will give you some idea on how to prepare your entry.

by DALE R. VAN HORN

DINGY basements can be converted into luxurious living room or recreation room quarters with such ease and economy that it is becoming the smart thing to do.



Tack wallboard panels to 1x2" furring strips which are fastened to the cement basement wall with toggle bolts or cement nails.



Build airways to put windows in low basements. Slope lawn as shown. Drawing shows indirect light.

Surprising results can be obtained as shown by the accompanying photographs.

By simply furring the walls and floor and using any one of several suitable materials for the finish the basement becomes a suitable place in which to live. Finished with patterned, paneled wall board, you can have a basement that you will be proud to show to anyone. The simplest treatment is merely to waterproof the walls, then paint or kalsomine them, cover the ceiling with wall board, then paint or varnish the floors.

You will enjoy planning a subdivision of the basement into a group of attractive rooms. Before undertaking the work, repairs and a general checking of conditions must be made. Here are several things to look for: seepage through the walls, cracks in the walls, low spot in floor, exposed electric wiring, rotted support columns, and

This basement was converted into a pleasing den at little cost. The fireplace is covered with log siding and the walls with pine boards finished in their natural color.

This attractive basement has an artificial fireplace, natural wood finish, patterned ceiling.

RULES FOR FIRST CONTEST

Suggestions for improving any part of a house can be entered in the contest.

Cost of home improvement must be limited to $100, not including paint or labor.

Improvement must not call for professional services. All work must be within the scope of the average home workshop man.

Each entry must include a written description of 1,000 words or less, giving detailed instructions on carrying out the house improvement. Rough sketches to illustrate suggested changes should be included. Photographs are not required.

Modern Mechanix and Inventions reserves the right to publish any entry winning a prize without further compensation to contestant.

Each contestant agrees to permit Modern Mechanix and Inventions to publish all or part of any entry not winning a prize. Entries so used will be paid for at regular rates for amount of material published.

No entries will be returned. The most useful and practical entries submitted will be awarded 14 prizes:

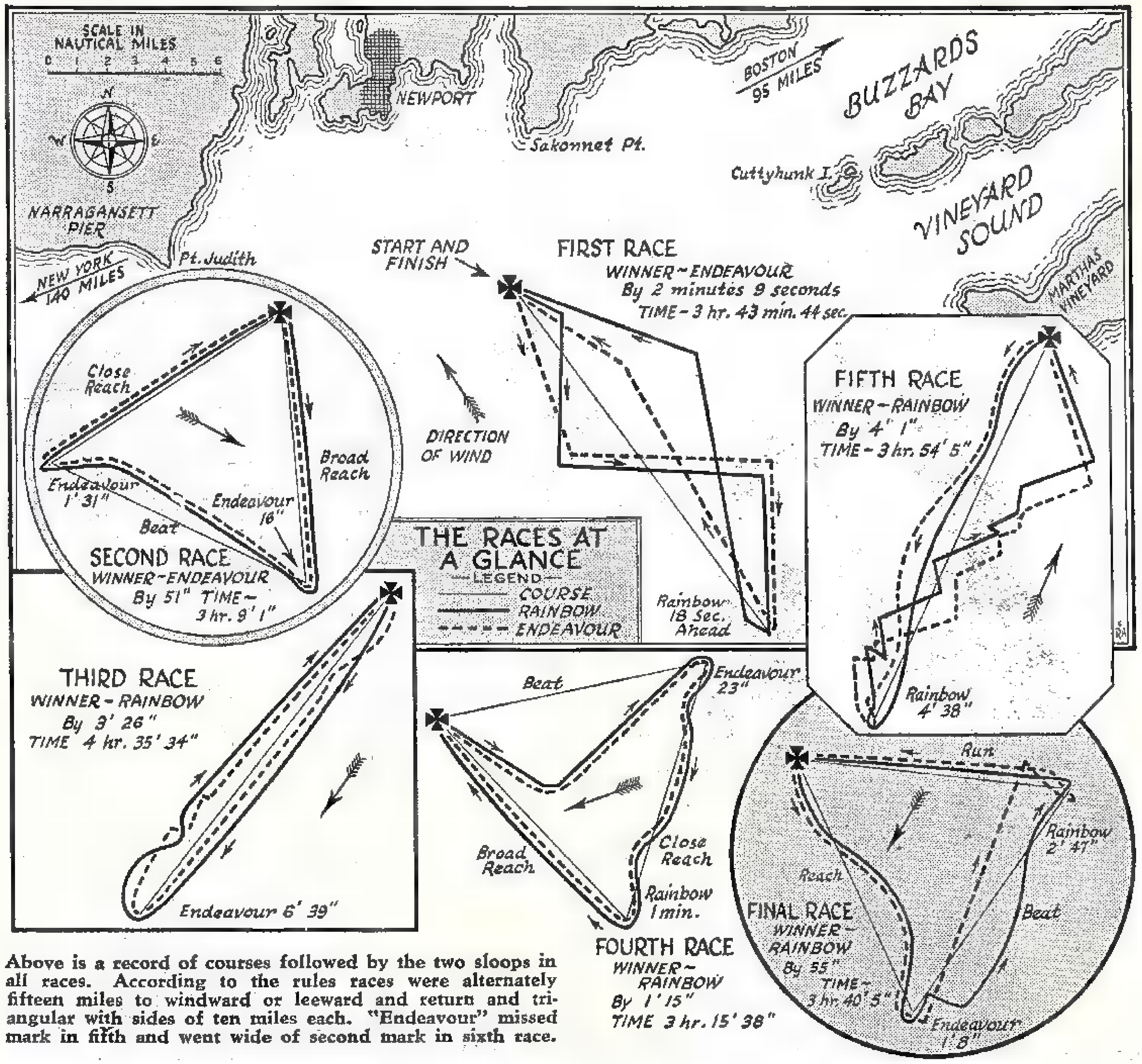
First prize $60.00; second prize $20.00; third prize $8.00; five fourth prizes at $5.00 each; six fifth prizes at $2.00 each; total $125.00.

Address entries to Home Improvement Contest, Modern Mechanix and Inventions, 529 S. Seventh St., Minneapolis, Minn. All entries must reach this office before midnight, December 22, 1934. Winners will be announced in the March, 1935, issue of Modern Mechanix and Inventions. An entirely different contest offering another $125 in prizes will be announced in the January issue.

SEE JANUARY M-M FOR NEXT CONTEST

WHY SPEED LOST IN *America's Cup* RACES

by **James Dvson**


SCALE IN NAUTICAL MILES
0 1 2 3 4 5 6
N
W
E
S
NEWPORT
Sakonnet Pt.
BOSTON 95 MILES
BUZZARDS BAY
Cuttyhunk I.
VINEYARD SOUND
MARTHAS VINEYARD
NARRAGANSETT PIER
Pt. Judith
NEW YORK 140 MILES
START AND FINISH
FIRST RACE
WINNER ~ ENDEAVOUR
By 2 minutes 9 seconds
TIME - 3 hr. 43 min. 44 sec.
DIRECTION OF WIND
Rainbow 18 Sec. Ahead
Close Reach
Broad Reach
Endeavour 1' 31"
Endeavour 16"
Beat
SECOND RACE
WINNER ~ ENDEAVOUR
By 51" TIME ~ 3 hr. 9' 1"
THE RACES AT A GLANCE
—LEGEND—
COURSE
RAINBOW
ENDEAVOUR
FIFTH RACE
WINNER ~ RAINBOW
By 4' 1"
TIME - 3 hr. 54' 5"
Rainbow 4' 38"
THIRD RACE
WINNER - RAINBOW
By 3' 26"
TIME 4 hr. 35' 34"
Endeavour 6' 39"
Beat
Endeavour 23"
Broad Reach
Close Reach
Rainbow 1 min.
FOURTH RACE
WINNER ~ RAINBOW
By 1' 15"
TIME 3 hr. 15' 38"
Run
Rainbow 2' 47"
Reach
Beat
FINAL RACE
WINNER ~ RAINBOW
By 55"
TIME ~ 3 hr. 40' 5"
Endeavour 1' 8"

Above is a record of courses followed by the two sloops in all races. According to the rules races were alternately fifteen miles to windward or leeward and return and triangular with sides of ten miles each. "Endeavour" missed mark in fifth and went wide of second mark in sixth race.

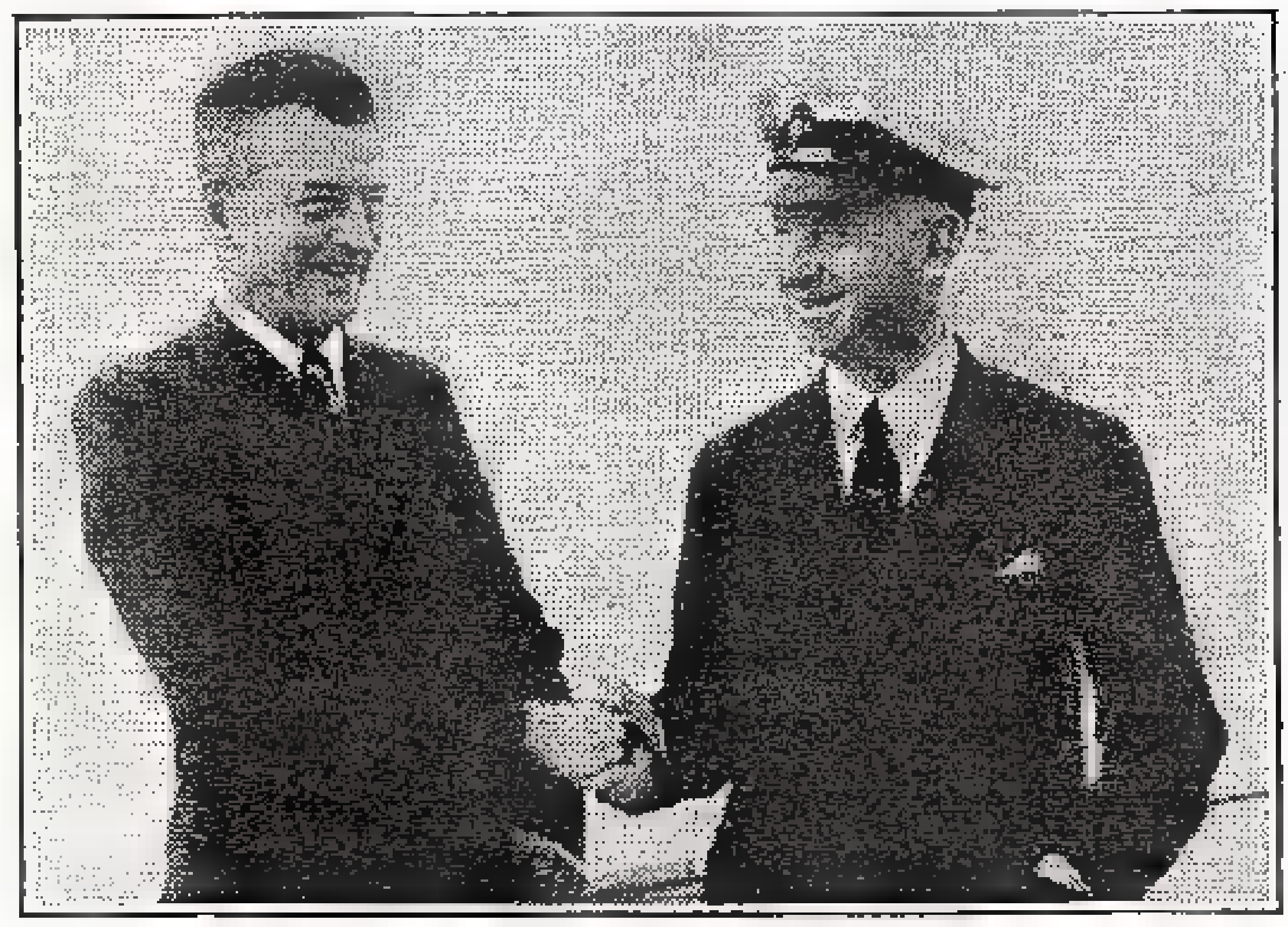
SPEED lost in the America's Cup Races. The sixteenth international sailing classic witnessed the paradox of an apparently faster ship going down to defeat.

Rainbow's victory upheld America's sailing supremacy. The British, on the other hand, have only the consolation of knowing that for the first time in 84 years they had an opportunity to bring the "old mug" back to England.

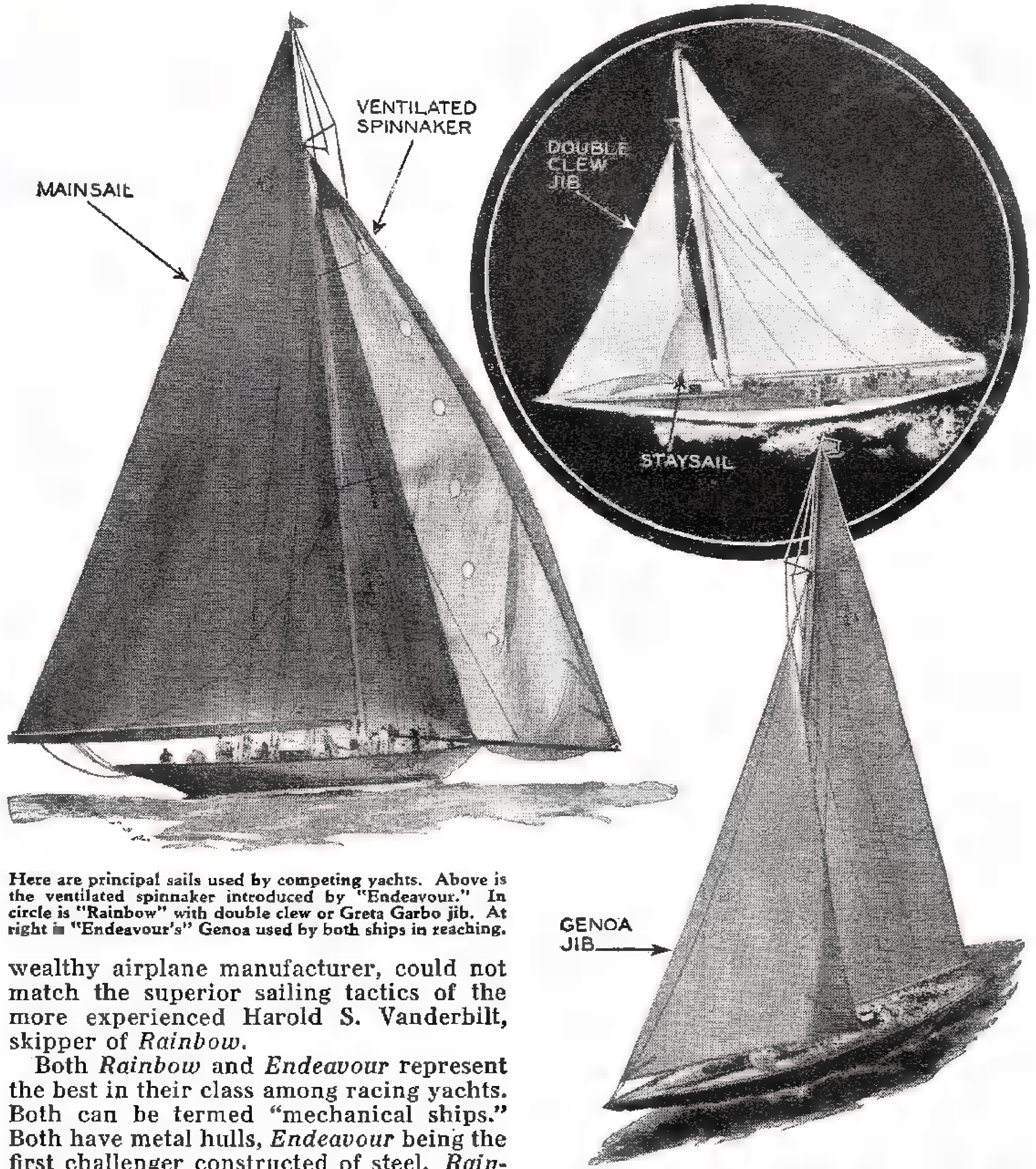
The simple statement that America won when *Rainbow* defeated the British *Endeavour* four out of six races hardly tells the story. Most experts agreed that the British sloop was faster than *Rainbow*, yet *Endeavour* was decisively beaten.

Why? Mainly because the comparatively inexperienced amateur British crew bungled so badly in handling ship and sails. The professional American crew made no mistakes. Then, too, experts concede that the British skipper, T. O. M. Sopwith, wealthy airplane manufacturer, could not match the superior sailing tactics of the more experienced Harold S. Vanderbilt, skipper of *Rainbow*.

TOTAL SCORE IN 84 YEARS OF RACES
United States Sailed 49 Races; Won 44; Lost 5
Britain and Canada Sailed 49 Races; Won 5, Lost 44.



Rival skippers shake hands. Harold S. Vanderbilt, American defender (left), and T. O. M. Sopwith, challenger.


VENTILATED SPINNAKER
MAINSAIL
DOUBLE CLEW JIB
STAYSAIL
GENOA JIB

Here are principal sails used by competing yachts. Above is the ventilated spinnaker introduced by "Endeavour." In circle is "Rainbow" with double clew or Greta Garbo jib. At right is "Endeavour's" Genoa used by both ships in reaching.

Both *Rainbow* and *Endeavour* represent the best in their class among racing yachts. Both can be termed "mechanical ships." Both have metal hulls, *Endeavour* being the first challenger constructed of steel. *Rainbow's* mast was of duralumin; *Endeavour's* of hollow steel. The British ship had four-speed winches compared to the American's two-speed for handling stays and sheets in various wind pressures.

The British ship was equipped with two speedometers and an electric wind vane and pressure gauge. She was the first challenger to have these modern improvements. Her skipper was able to see the slightest variation in wind instead of relying on his judgment as in the past.

Sopwith called on the science of aeronautics in rigging his ship. He made wind tunnel tests of a model of *Endeavour* to discover the most efficient combination of various sails. Handling of these sails proved to be the leading factor in his defeat.

The ships this year used jib and staysail in going to the windward compared to the former three headsails. The jib used on both ships is what is called a double-clew sail. The after-part of this large sail was cut off and two sheets attached to make it set better. That made it quadrilateral in

(Continued on page 145)

Fire at Sea!

CAN SCIENCE END DISASTERS?

by CAPTAIN FELIX RIESENBERG

Heroism at sea is usually more evident among passengers than crew, declares the author. This woman, survivor of the Morro Castle, braved icy waters by diving overboard from the burning ship. She was picked up by a rescue ship.

An authority on sea topics, Captain Riesenberg sailed the oceans of the world in sail and steam. He is a member of the U. S. Naval Institute and the Society of Naval Architects and Marine Engineers.

Accusations, protests, and investigations have followed every major tragedy at sea. Will the Morro Castle's burned hulk leave a lesson for the world? This article discloses the need for greater safety at sea.

IN THE dark hours before dawn that terrifying word "Fire!" aroused passengers on board the *Morro Castle* from their peaceful slumbers. In the radio room the operator tapped out the sea's signal of distress—"SOS." Within an incredibly short time the ship, a modern liner, was a blazing holocaust.

Passengers and crew jumped for their lives. Some escaped in lifeboats. Some were picked up by rescue ships. A few swam eight miles through the cold, choppy sea to the safety of the New Jersey shore. But when death's toll was counted, the lives of 132 persons were charged to this latest disaster at sea.

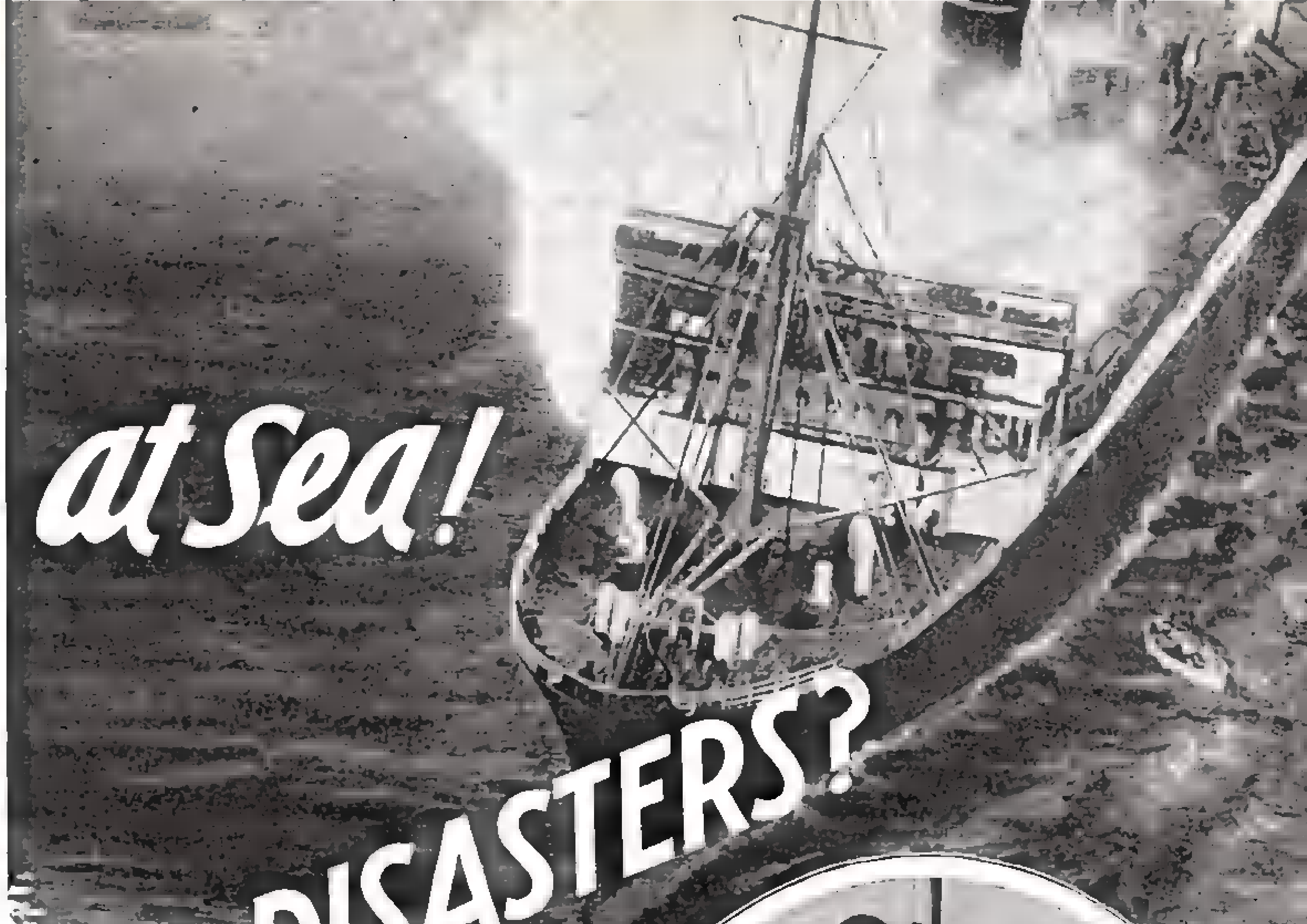
Few passengers were saved in the lifeboats of the Morro Castle. Members of the crew were predominant in the boats, such as this one, that reached the Jersey shore.

The burning of the *Morro Castle* vividly brought before the public the ever-present danger of fire at sea. That public now looks to the government, to steamship lines and to science to reduce this most dreaded hazard of the sea.

History shows that one by one other hazards, resulting in disaster, have been reduced to negligible percentages. The sinking of the *La Bourgogne* in 1898 with a loss of 562 lives resulted in improved discipline and training of crews. The collision of the *Republic* and the *Florida* in 1909 showed the value of radio and led to its compulsory use. The loss of 1,517 persons on the *Titanic* in 1912 after collision with an iceberg resulted in the establishment of the International Ice Patrol. More recently the *Vestris*, in which 110 persons met death, showed the necessity of rigid inspection of ships.

Radio beacons, echo depth sounders, and submarine bells have reduced the chance of grounding. Fire in the holds and bunkers of cargo craft is now controllable by the use of steam, carbon dioxide gas and foam spreading apparatus. But fires above the cargo holds, in the congested passenger quarters of the most modern ships, are still to be conquered.

Fires on the high seas in modern vessels are not unusual and are not among the things that cannot happen. Any wisp of smoke, the slightest indication of flame, may be the beginning of a major tragedy. The *Morro Castle* will serve to further drive home a warning and must give everyone a definite sense of the grave danger involved in any fire at sea.



Above, an aerial view of the Morro Castle afire with rescue ships in the background. The forward end of the ship was scarcely damaged by fire, the officers remaining there safely until taken off by the coast guard. In lower photo National Guardsman examines undamaged clothes left by passengers on stern when ship was abandoned.

Whatever the original cause of the *Morro Castle* fire, carelessness, defective wiring, explosive brass polish, oil fumes, or a com-

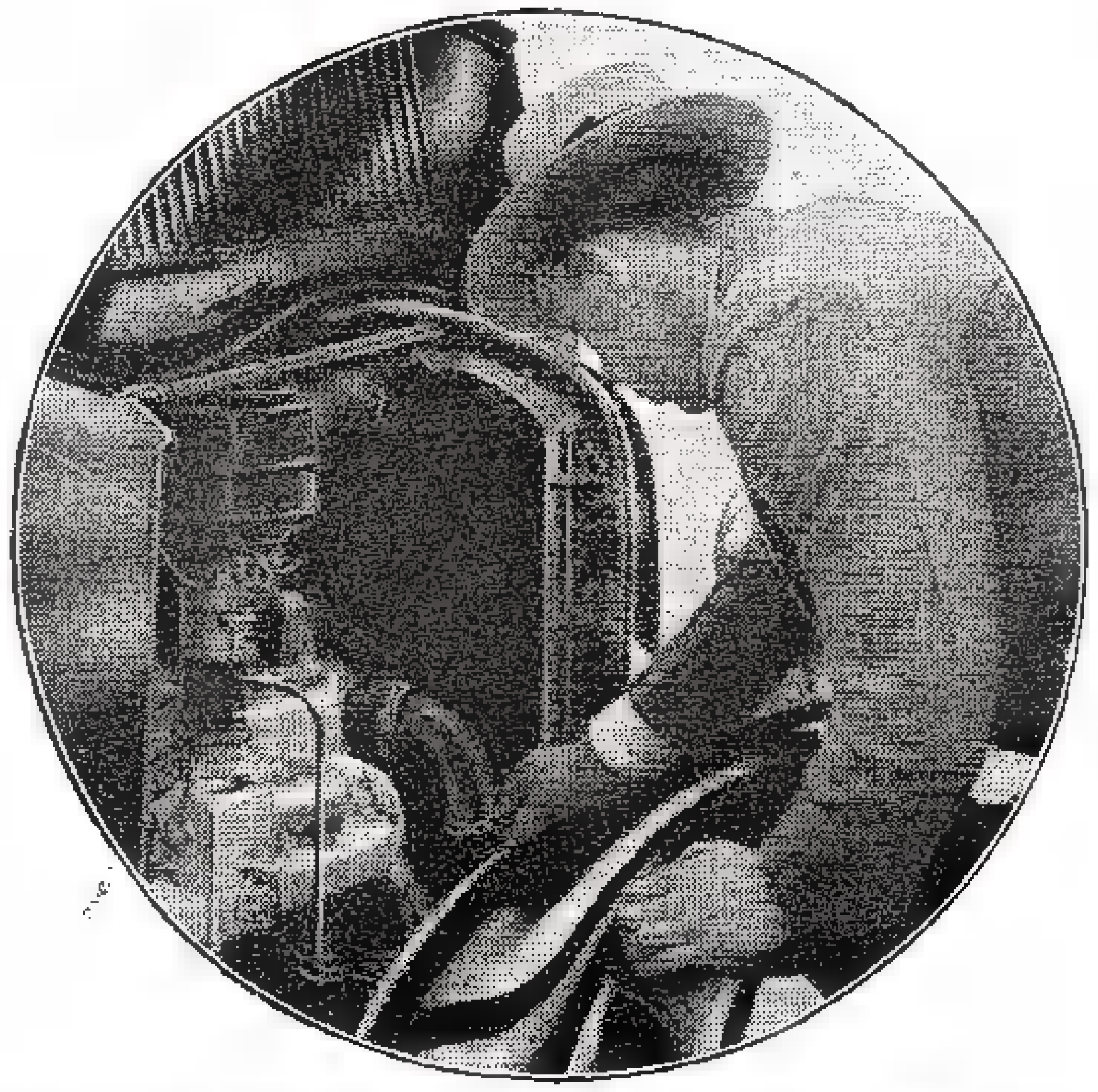
(Continued on page 135)

PREPARING YOUR CAR *for* WINTER DRIVING

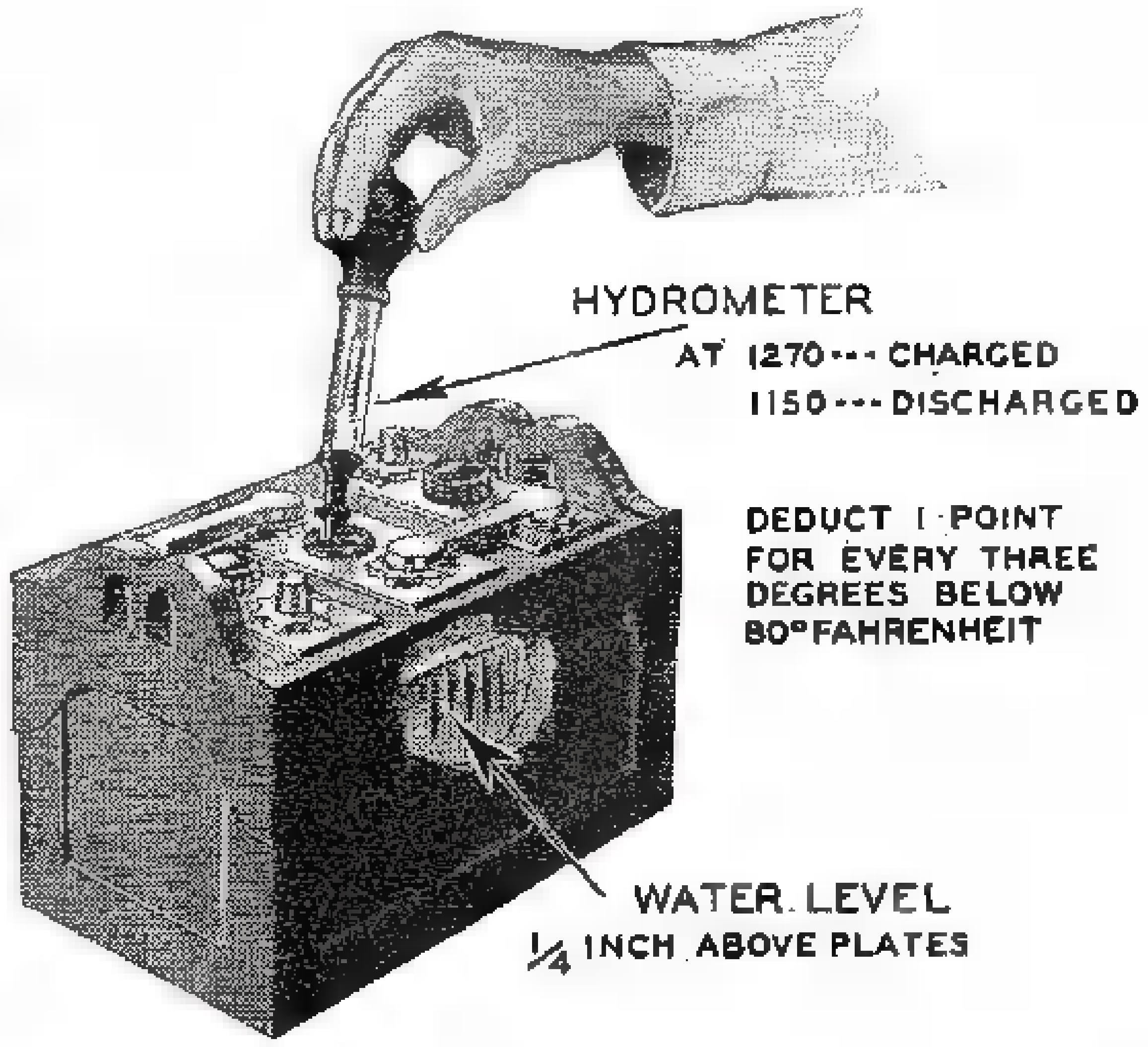
by PROF. B. J. ROBERTSON

Mechanical Engineering Department
University of Minnesota

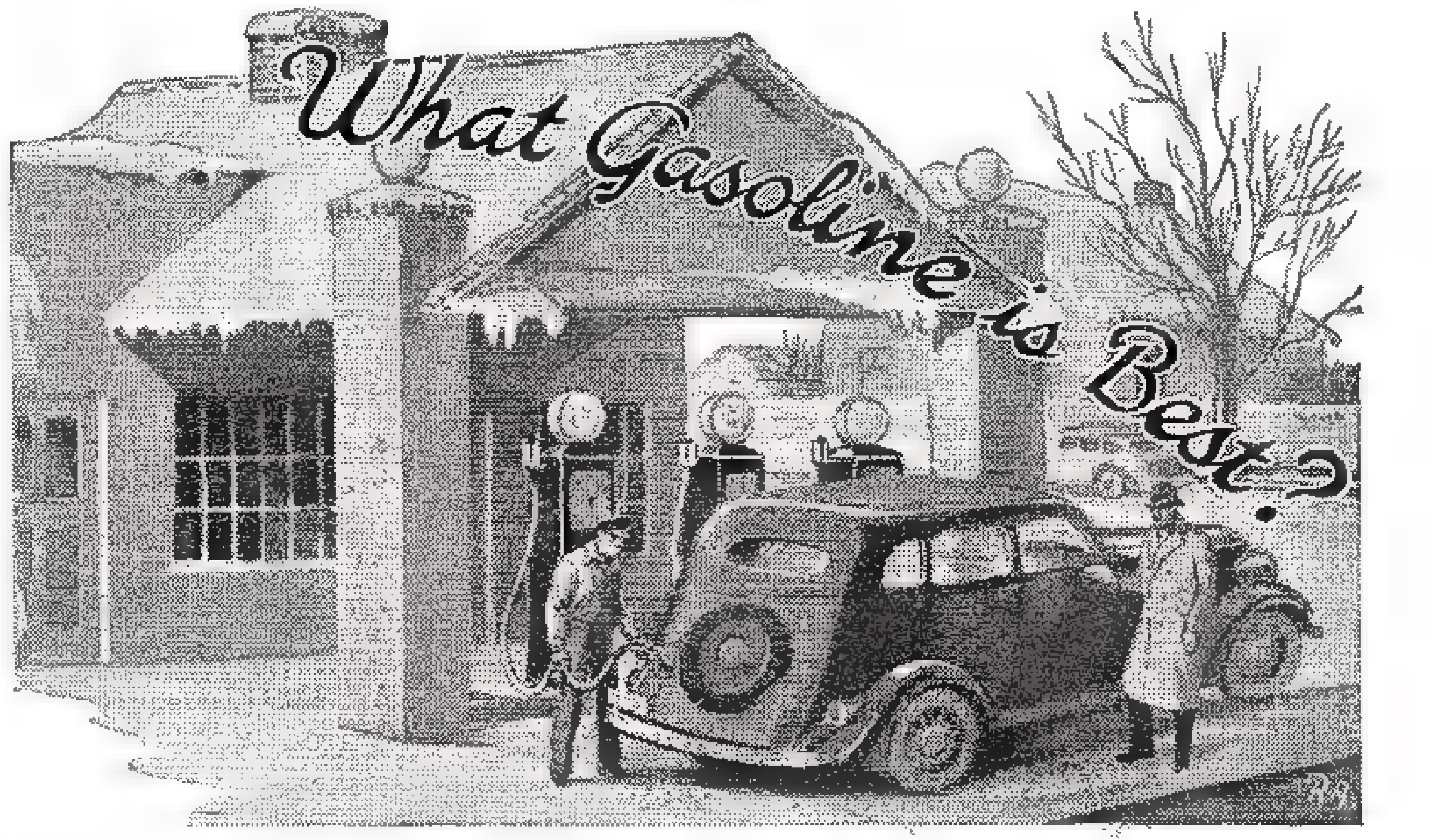
With the advent of below-freezing winter temperatures, new problems confront the motorist. Radiator and battery must be protected against freezing, oil and grease changed, and consideration given to the gasoline being used. A noted authority here tells just how to foil "King Winter."



Flush out and clean cooling system with sal soda, then replace all soft or damaged hose connections, before putting anti-freeze solution into your car radiator this winter.



Inspect the car battery weekly during cold weather. Make temperature corrections to hydrometer reading as shown above. Add distilled water before, not after using the car.


What Gasoline is Best?

LOW GRADE—if car starts easy, gives no carbon knocks.
REGULAR—if car is hard to start or misses with cheap gas.
HIGH TEST—for new high compression cars with good rings.
ETHYL—stops knocks. Aids in burning out carbon deposits.

TROUBLE-FREE winter driving can be obtained only by careful attention to the car before cold weather sets in. Too many automobile owners, putting off necessary winter preparations in the hopes of saving a little money, are caught unprepared by an unexpected cold spell.

The cooling system is generally the first to be affected by wintry temperatures. Water in the lower hose connection freezes, stopping circulation through the radiator. Adding anti-freeze compounds with the engine in this condition is worse than useless; the lower water connections must first be completely thawed out. Hot water poured on the outside of the frozen pipes will be found very effective. Covering the radiator front with a blanket keeps some of the exhausted steam inside the hood where it may heat the air surrounding the frozen pipes until they thaw enough to allow the water to circulate.

The wise motorist anticipates the cold snap and prepares his cooling system before hand. Of the many compounds available, each has its advantages and drawbacks.

Denatured alcohol is used very extensively. The addition of a sufficient quantity will effectively prevent freezing at any temperature encountered in the civilized world. It does not injure either the engine or radiator, but alcohol vapors or the liquid, if spilled, will attack the finish on a large number of cars. Boiling at a temperature of about 180 degrees, the losses by evaporation necessitate frequent additions to the radiator, especially where drivers cover long distances daily.

Wood alcohol and Methanol—an alcohol made from coal—are even more effective than the denatured product. A 50% solution of denatured alcohol freezes at 18 degrees below zero while a 50% solution of wood alcohol does not freeze until 40 degrees below zero is reached. Wood alcohol is poisonous; its fumes, while not so offensive to many as those of the denatured product, sometimes produce a nausea.

Glycerine, when distilled and refined properly, does not attack the radiator or engine block. Be sure that the glycerine you buy is pure. In adding it to the radiator, it is much better to stir the glycerine and water together in an outside container. Some manufacturers market it ready-mixed with water in cans. When once in a solution with a small proportion of water, it mixes readily with additional water, and may be poured directly into the radiator.

Ethylene glycol is being manufactured in quantities for radiator protection. It is much thinner than glycerine, is not corrosive and like glycerine will not boil away at temperatures more than 150 degrees above the boiling point of water. Only water need be added during the winter so long as there is no loss by leakage. This anti-freeze is ideal for long winter drives.

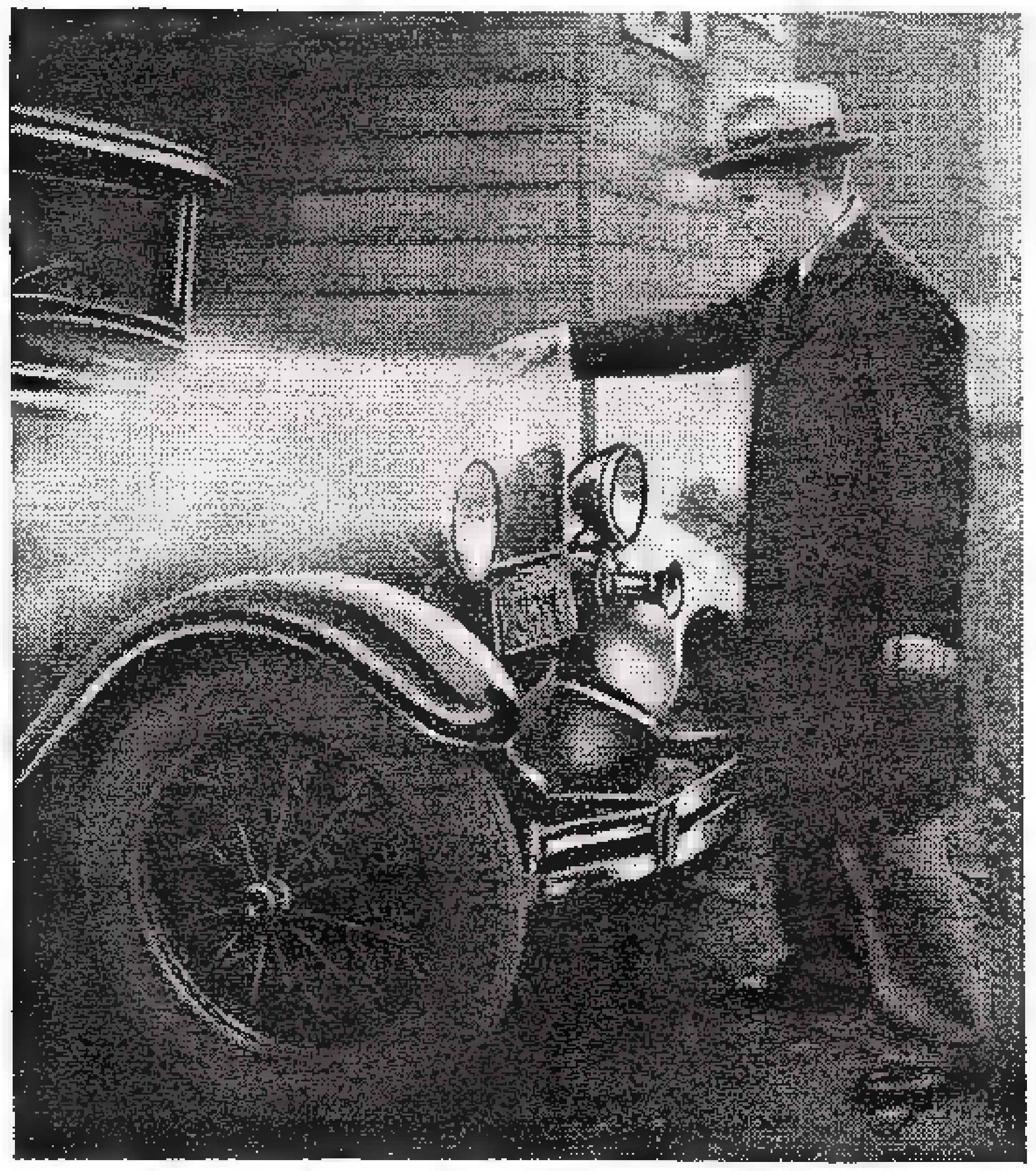
Calcium chloride solutions are very inexpensive and may be made freeze proof at 50 degrees below zero. While less corrosive than a salt and water solution, they are very troublesome when used in an automobile cooling system. If gaskets are leaky, corrosion takes place between the cylinder head and the block, oftentimes making it almost impossible to remove the head. Do not spill the solution on the ignition wiring because short circuiting may result.

The radiator and cooling system should be drained and thoroughly flushed out be-

(Continued on page 151)

What Anti-freeze Solution Shall I Use?

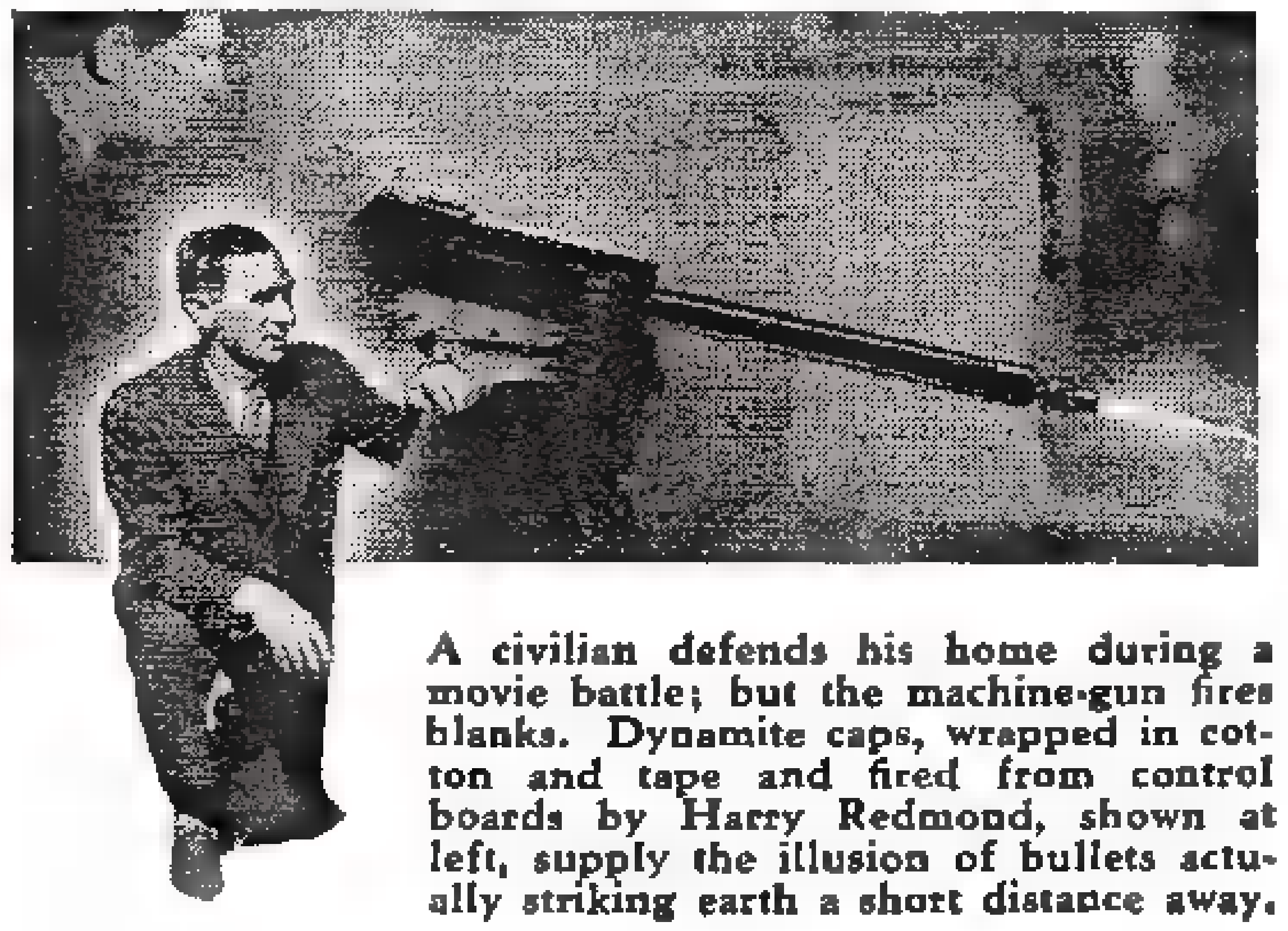
ALCOHOL Denatured Wood or Methanol	Most commonly used anti-freeze. Evaporates rapidly on long drives. Cheap, effective if enough is used. Withstands much lower temperatures than denatured product. Poisonous, with fumes often producing nausea. Does not harm engine.
GLYCERINE	When pure, does not attack engine or block. Does not evaporate in engine. Mixes readily with water.
KEROSENE, DISTILLATE, OR LUBRICATING OIL	Cost low. Favorably increases operating temperature of engine, delivering more heat to auto heater. Inflammable when hot. Injurious action on rubber, requiring yearly hose replacement. Remove all water from radiator before pouring in oils. No. 10 lubricating oil, cheap grade, or crankcase waste, gives same results with less danger of fire.
STRAINED HONEY	Thicker than glycerine. Much greater proportion needed to prevent freezing. Extremely thick when cold, interfering with circulation.
ETHYLENE GLYCOL	Much thinner than glycerine, non-corrosive, and will not boil away in car. Ethylene glycol mixture (such as Prestone) is ideal for winter trips.
CALCIUM CHLORIDE	Generally obtained in inexpensive commercial solutions. If engine gaskets are leaky, corrosion may take place. Should not be spilled on electric wiring or car finish.



Steaming radiator is sign of careless, unprepared motorist. Put anti-freeze in car early, to be prepared for first cold spell, then check often to keep it at proper concentration.

Behind the SCENES on Movie BATTLEFIELDS

A mixture of charcoal and powder, wired to Redmond's control board, provided this thrilling but harmless explosion as movie troops went over the top. Safety is assured the actor-soldiers by construction of the shell pits which are built to expend explosive force upwards.



A civilian defends his home during a movie battle; but the machine-gun fires blanks. Dynamite caps, wrapped in cotton and tape and fired from control boards by Harry Redmond, shown at left, supply the illusion of bullets actually striking earth a short distance away.

Harry Redmond, Hollywood's war lord, has laid down barrages of high explosives on more than 30,000 movie troops without a casualty. In this article he reveals the secrets of how he wages war for the movies.

by HARRY REDMOND

Hollywood Explosives Expert

PUSHING forward across a huge battlefield, 4000 movie soldiers, many of them veterans of World war shell fire, quickened their steps as the earth mushroomed skywards to the explosion of a heavy shell. Machine-gun bullets furrowed the ground at their feet; shrapnel screamed overhead; great geysers of earth were hurled high in the air as the barrage swelled to a thundering climax.

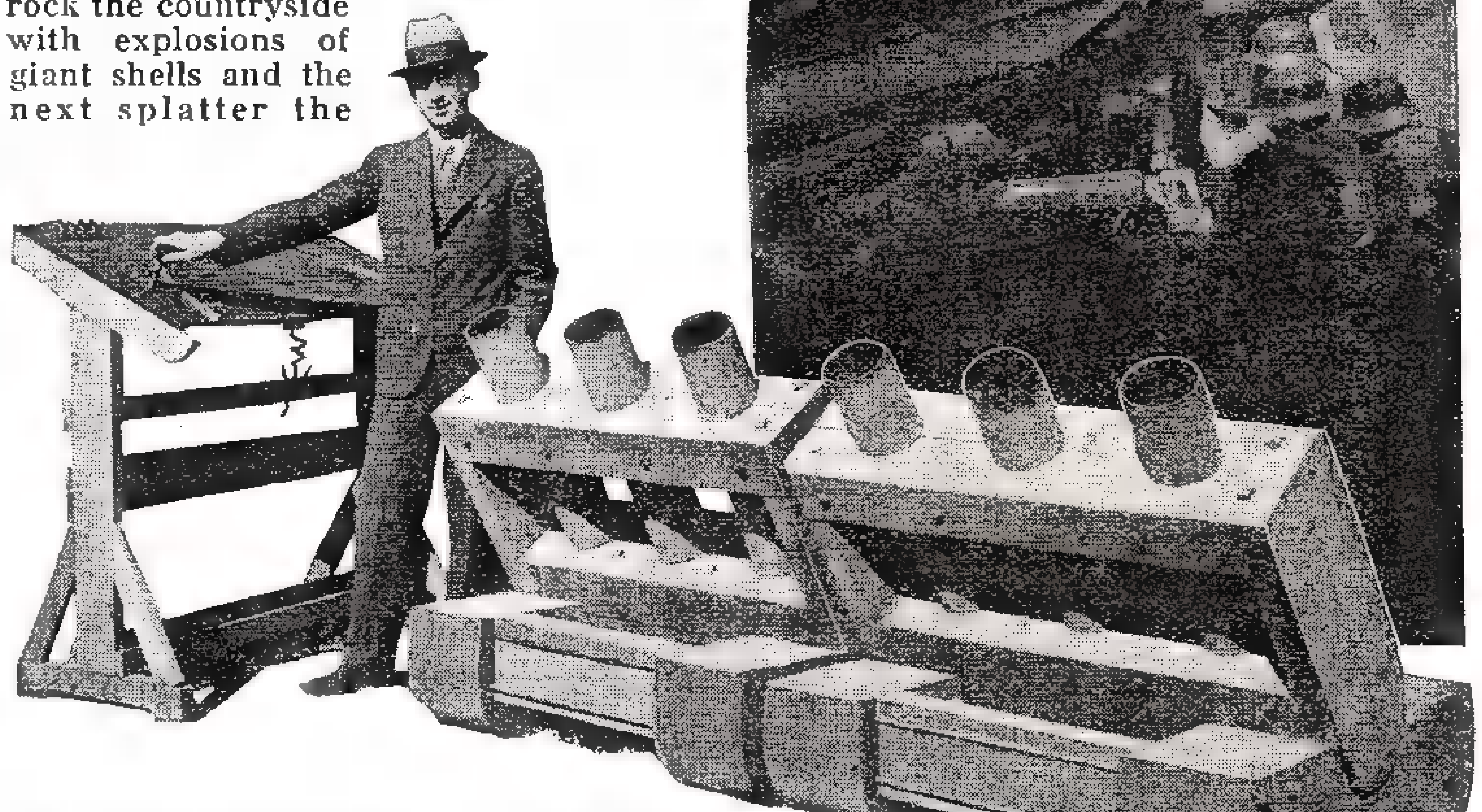
From my firing board beside the cameras, I surveyed the scene with satisfaction. Everything was working out with split-second precision. Suddenly my nerves tensed as a terrific roar tore the very heavens open. Twenty-five large pine trees, previously loaded with dynamite for the effect of shell fire which would tear them from their roots, had exploded ahead of schedule.

Redmond's Biggest Movie Explosion

Unwittingly I had provided the biggest explosion ever set off on land for moving pictures—twenty-five cases of dynamite! I had planned to touch off the trees one at a time, but the concussion proved so powerful that the dynamite went up with a roar, spreading in a few seconds from the middle tree down the line to both ends. Yet so carefully had we notched the trees near their bases that not one man was injured.

In two decades of providing thrills of a hundred major battles and minor skirmishes for pictures I have fired on fully 30,000 troops without a single casualty. Sometimes only a few hundred men advanced through my barrages, while again the "troops" numbered thousands as they went over the top and marched grimly through what appeared to be a withering fire of high explosives, shrapnel, mines and machine-gun bullets. From "battle organs," or firing boards, connected through thousands of feet of cable, my assistants and I spot these shots to explode within a few feet of the uniformed men, yet the actors are never in danger.

I have fought battles not only on the surface of the earth, but also in the air and on the sea. The secret of staging these safe but realistic battle scenes lies not only in dependable aides and equipment but, more important, in a retentive memory. With a telephone clamped to my mouth I issue orders to as many as five assistants who spot the explosions in the background, in the middle-ground, near the cameras, on sides and center, while I stand before my own board closing circuits which one minute rock the countryside with explosions of giant shells and the next splatter the



Harry Redmond, explosives expert, is shown at the electrical control board with which he fires on troops as shown in the panel, right above. At the immediate right are mortars used for shrapnel or anti-aircraft shells.

Finding Your Way When LOST in the WOODS

SPORTSMEN'S CAMPFIRE

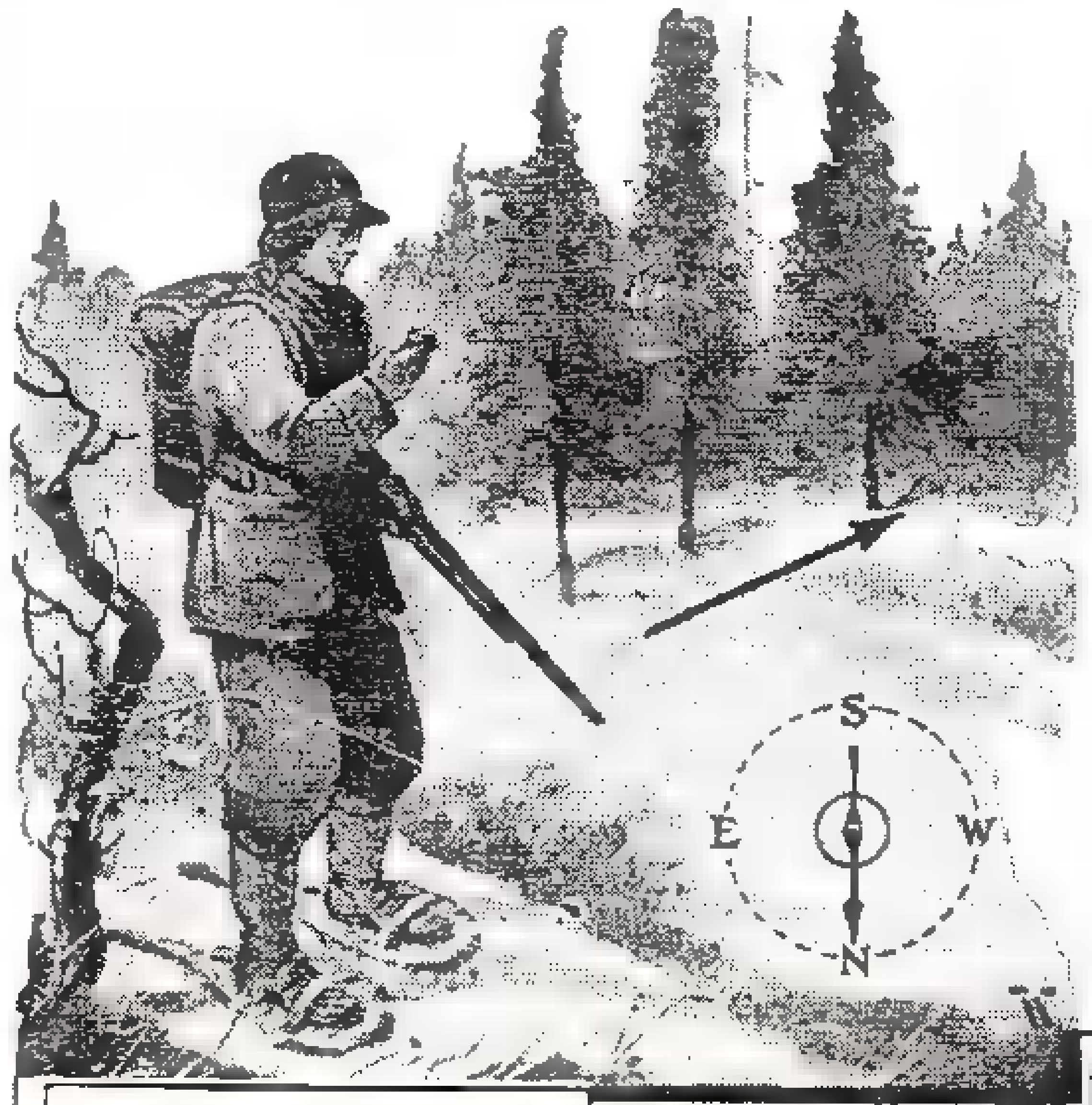
by

ROBERT PAGE LINCOLN

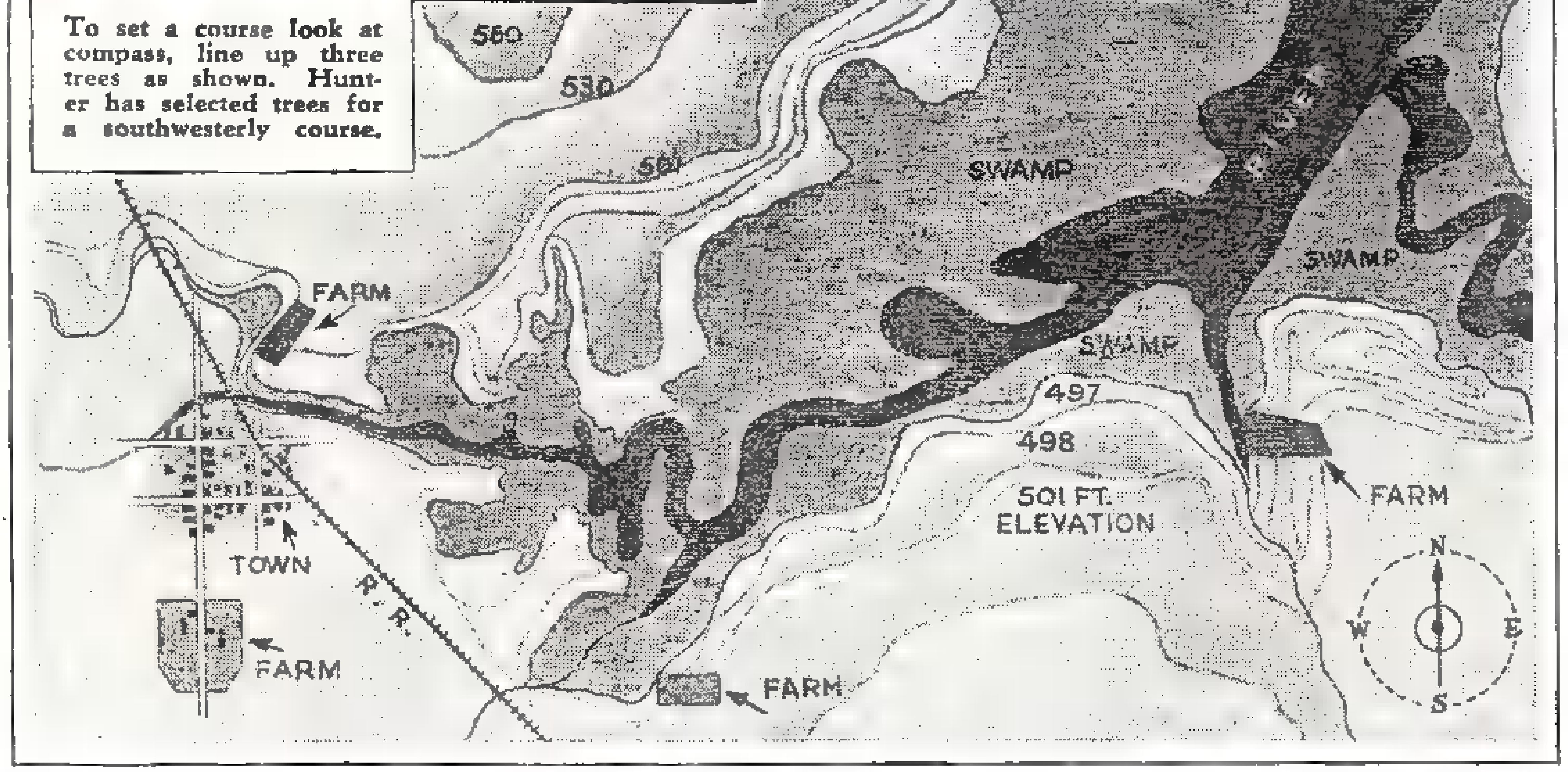
Adventure and a test of hunting ability await the big game hunter. Here are helpful tips on hunting deer, moose, and mountain sheep.

BIG game hunters often must go miles away from civilization as they tramp through the woods and hills seeking deer, moose, and other game. When snow obliterates trails and game leads hunters far off the beaten paths, there is a constant danger of becoming lost.

Becoming lost is not as terrible an experience as it may seem if the hunter knows a few simple rules that will help in finding the way back to camp. The big danger of getting lost in the woods is becoming panic stricken. So great is this danger that a few helpful hints on finding one's way through the woods will be given before going into a general discussion on guns and tips on hunting such game as deer, moose, and mountain sheep.



To set a course look at compass, line up three trees as shown. Hunter has selected trees for a southwesterly course.



A topographical map is very valuable in the woods. If lost, hunter has several landmarks on above map to get bearings, such as the river, 560-foot hill, and railroad. By climbing tree he should be able to see at least one of these landmarks.

As a precaution against becoming lost carry a good map of the region in which you are hunting. Make this accessory as necessary to your equipment as your gun. If possible, get a detailed county map. Topographical sectional maps are obtainable from the government for some parts of the country. Study the map, noting the physical nature, lakes, heights and streams of the region. A large lake may be the center of the immediate region. If you get lost you can climb the tallest tree near you and at once locate the lake. A railroad running through the region is a certain means of finding your way out. Knowing if it runs east and west or north and south your compass will then tell you which way to go.

Snow Is Both Aid and Enemy

When there is snow on the ground, quite often you can follow your own foot prints back to camp. If there is no snow or if it has been snowing steadily while you have been in the woods, it will be difficult to trace your way back. Trails in the woods can not be relied upon, as they lead in all directions. Main trails, however, lead to definite places, and can be followed. In the north woods, if your compass shows that a main trail runs north and south, you can be fairly certain of finding some form of civilization by taking the trail to the south.

Get in the habit, when off the beaten track, of walking in a straight line, which is readily done by lining up with trees ahead of you. By keeping three or four trees in view it is an easy matter to keep a general straight line. Unless this is done, one is likely to walk in a circle, the common habit in the woods when lost. Trust your compass. If it says North, then believe it.

As soon as you realize you are lost, stop right where you are and take stock of the situation. If possible climb the tallest tree around you and look the country over. Without doubt you will observe some familiar landmark to guide you. If you decide to walk, break twigs as you go. You can then follow the broken twigs back to where you were if necessary.

Fire Your Rifle to Indicate Position

If lost, and night comes on, fire your rifle, first two shots, rapid, then one after a little space of time. Listen for answering shots. Keep a fire going and in the day time make a smudge out of it so that the smoke will mount high into the air. Smoke is easily seen in the woods and will be marked for miles in the clear, frosty air.

It is a good idea to carry a .22 caliber pistol when hunting in the woods. With it you can kill small game if necessary. A small pocket cooking kit and a waterproof match case are also valuable and can easily be carried in the hunter's coat.

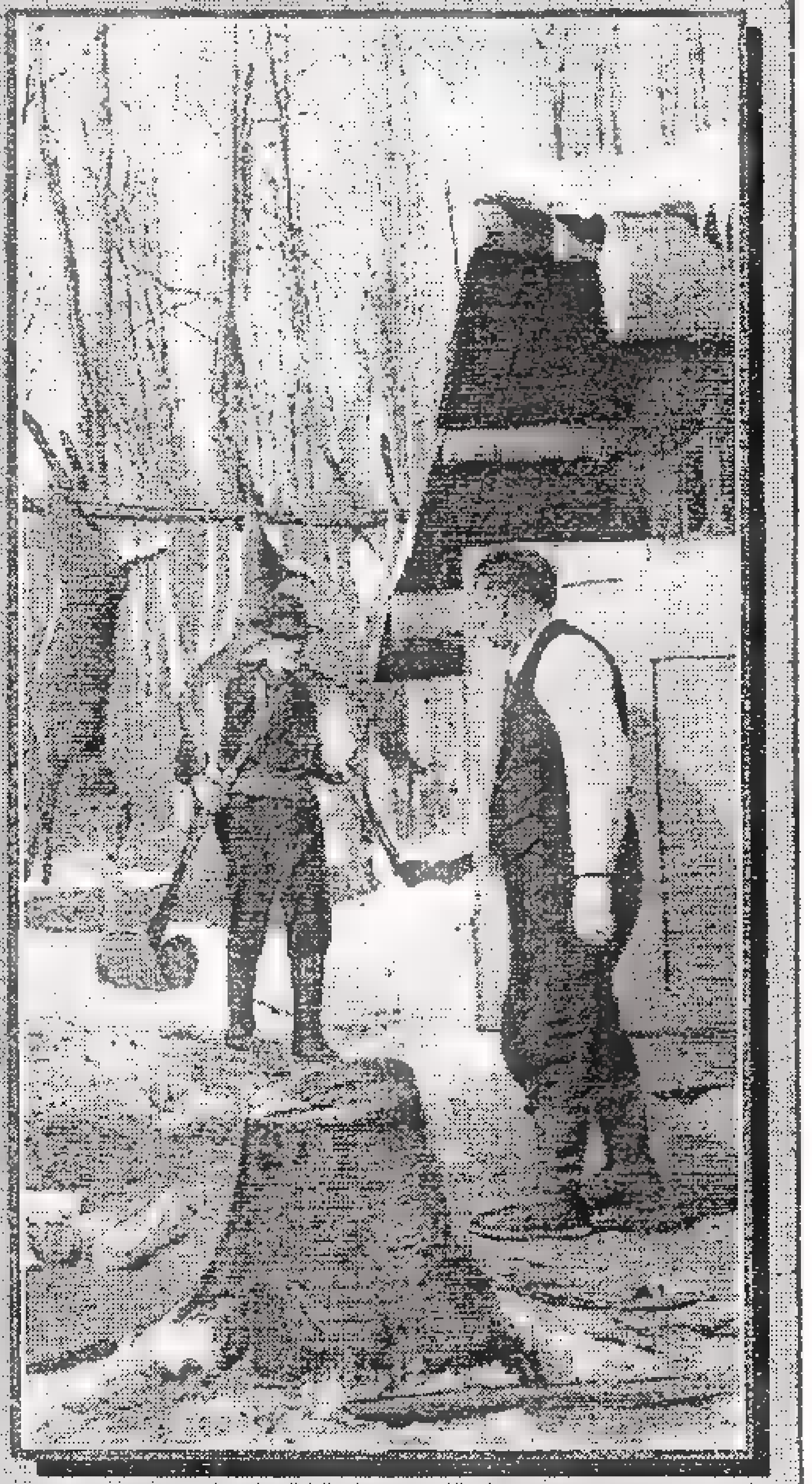
Hunting deer and other big game found in North America is one of the most thrilling of outdoor sports within reach of the average man. In big game hunting the hunter is seeking a quarry more his equal in size. The game is swift of foot and very elusive. It is a sport matching the wits of an animal against the intelligence of man.

Deer hunting is the most popular of big game sports. Although thousands are killed every year, deer continues to be plentiful. In some states, where alternate hunting seasons prevail, the number is increasing.

Careless Hunters Increase Hazards

As a result deer hunting has become a sport within reach of all. Thousands who have a car and gasoline, go into the woods hunting. Consequently the skilled and careful hunter is thrown in with the careless and unpractised person. That accounts for many accidents due to deer hunting.

You can help the sport by observing a few simple rules in the woods. Do not fire carelessly in the direction of any noise you hear. Be sure that you see the deer before you fire. It takes only a fraction of a second before shooting for the eye to take in an area ahead of the gun to be certain that



Returning to his cabin this hunter has the thrill of recounting his adventures in bringing down the deer.

SPORTSMEN'S CAMPFIRE

Stalking Deer Tests Hunter's Skill and Cunning

no human being is in line of fire. When crawling over fences or other obstructions, be very careful of your gun. Thrust it carefully ahead of you and keep the muzzle pointing toward the ground, not toward the man who has preceded you.

Medium-power rifles, such as the .25-20 and the .32-20 are not recommended for deer hunting. Better rifles are the .30-40 Krag, the .250-3000 Savage, the .30-06 Springfield, and of course the common everyday .30-30 so well known to hunters the length and breadth of the land. An open-point, expanding, high-velocity bullet is best for deer and other big game. It has the power and the shock to kill.

Hunting is best after a snow fall. When there is a good tracking snow the possibility of obtaining a shot is increased many fold. Added to this, the snow deadens the sound of one's walk over the leaves.

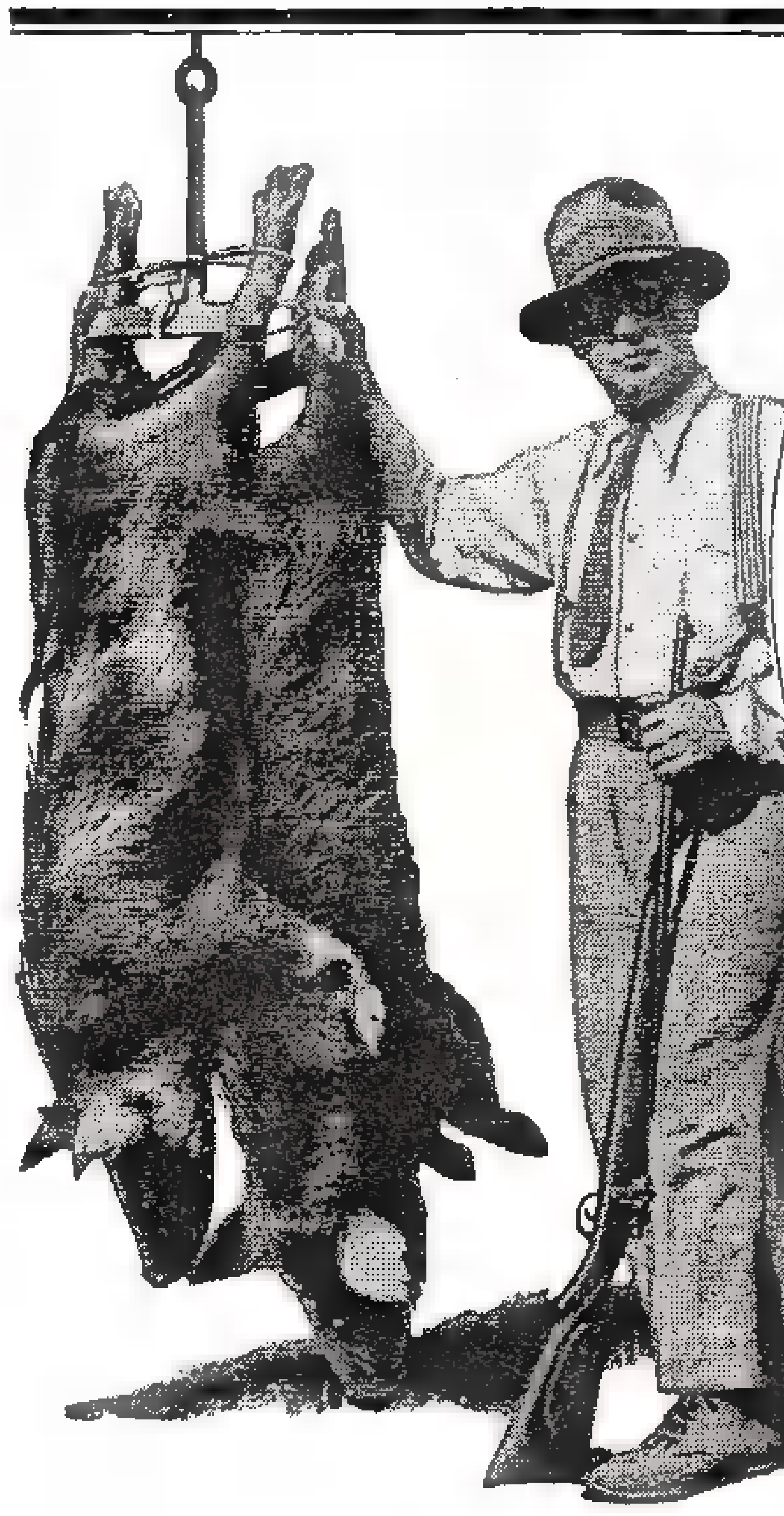
When no snow is on the ground the drive method is often used. Certain hunters of the party station themselves at commanding points while other members of the party drive toward them. Generally the deer will break into the open. The wind being toward the hunters posted on guard the deer does not draw scent of them, but does scent the drivers. Naturally they attempt to evade the drivers by running in the opposite direction. This method of driving deer is not highly recommended because there is so much danger of accident. Neither should hunters go out in large parties, because the more men there are in the woods the greater the danger.

In the drive method when two or three hunters work together, the hunter on guard, watching for the outcoming deer, is posted at a likely runway down which any deer,

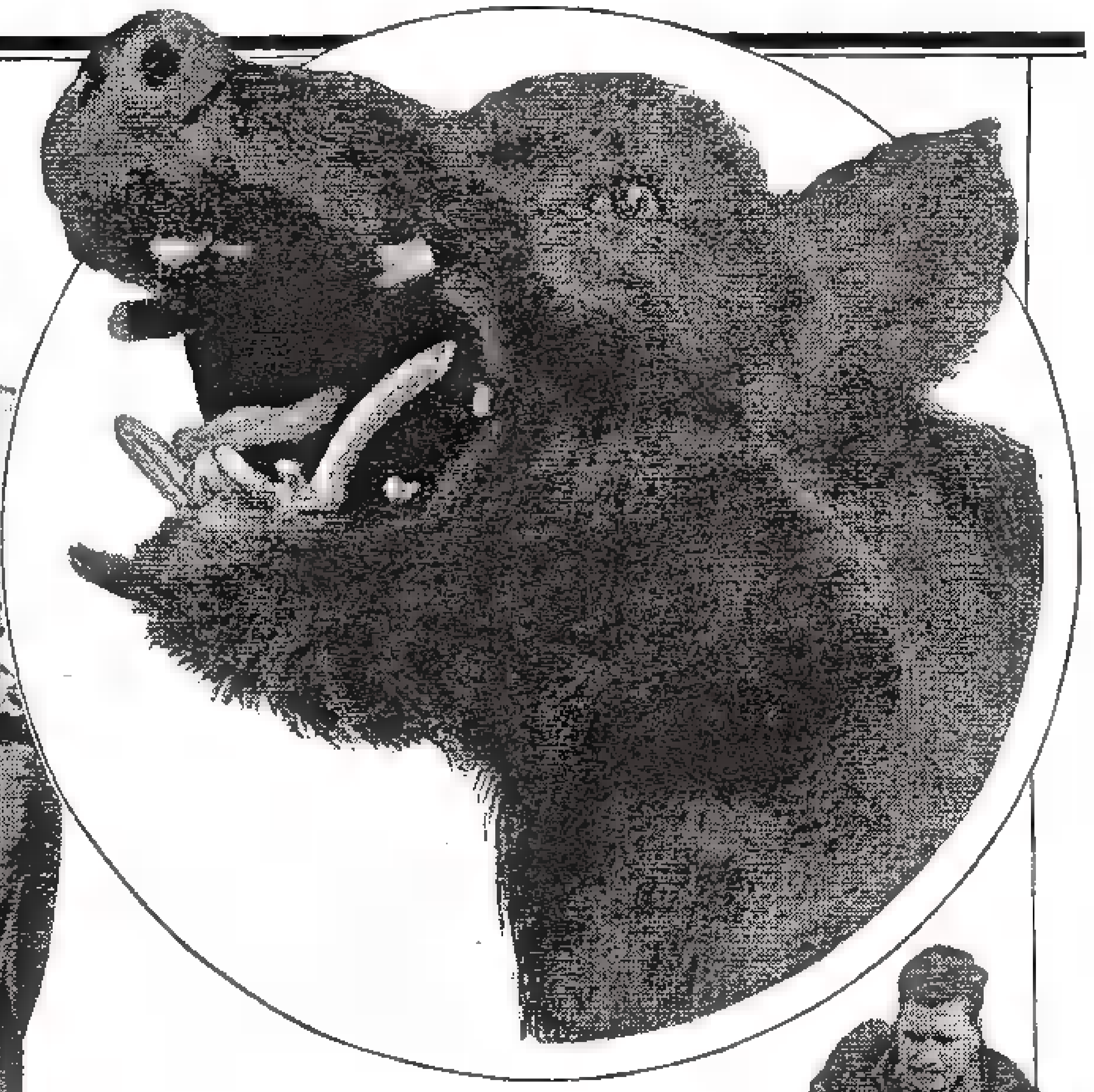
(Continued on page 130)

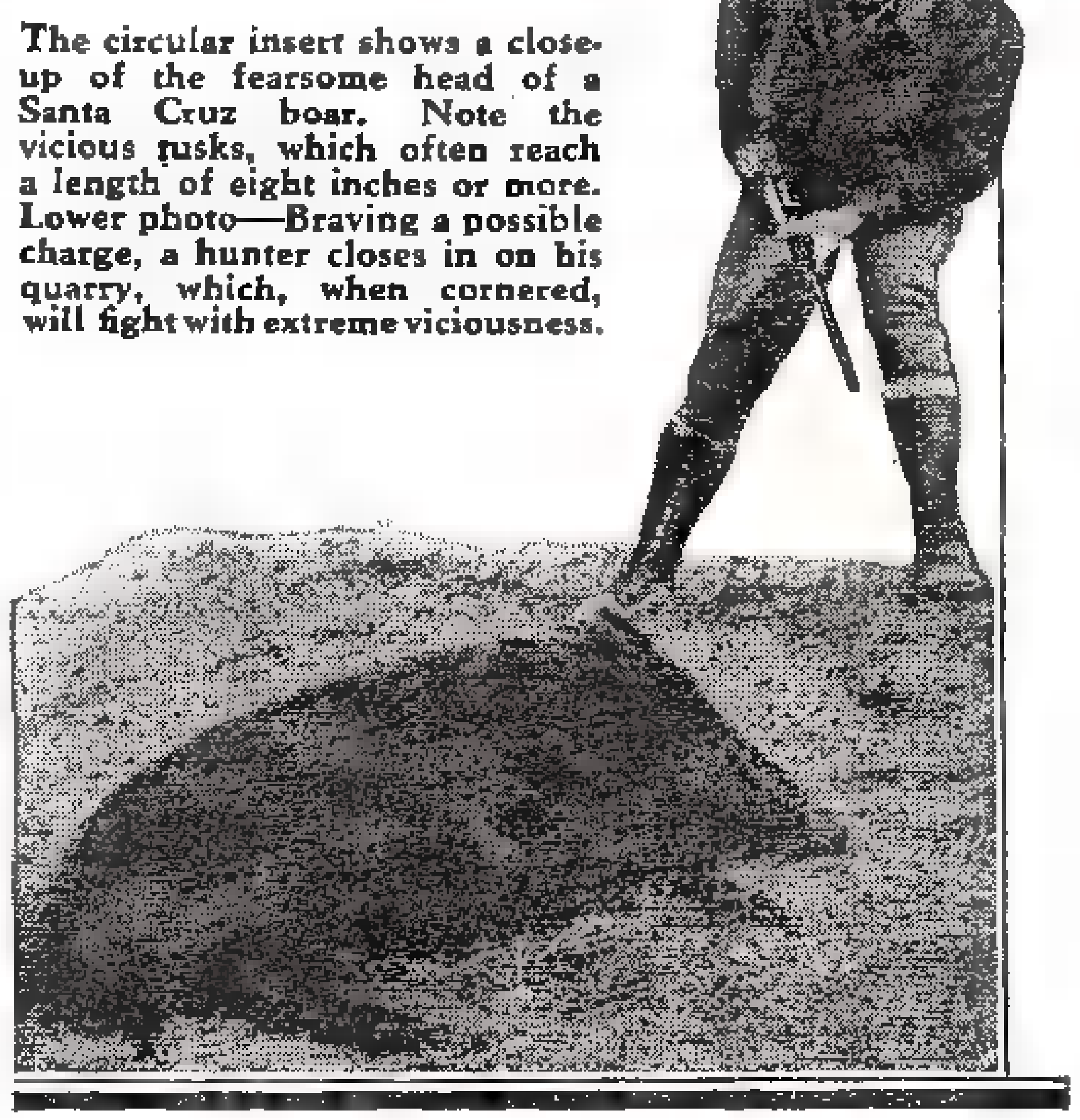
Beating a trail back to the cabin after a day in the woods is often a ticklish problem for the lone hunter unskilled in woodcraft. In the accompanying text are a number of valuable suggestions to offset the dangers of being lost.

America's Unusual Sport—Hunting Vicious Wild Boars



Introduced by Spanish colonists as domestic animals more than 300 years ago, the wild boar of Santa Cruz island is today one of America's most unique and dangerous species of game. Photo shows hunter with two of the beasts.





The circular insert shows a close-up of the fearsome head of a Santa Cruz boar. Note the vicious tusks, which often reach a length of eight inches or more. Lower photo—Braving a possible charge, a hunter closes in on his quarry, which, when cornered, will fight with extreme viciousness.

DOMINATING the lonely little island of Santa Cruz, about 20 miles off the coast of Southern California, is one of the most unique species of game to be found within the boundaries of the United States.

For Santa Cruz is the home of the American wild boar—savage tuskers that are quick to battle man or beast. Weighing up to three and four hundred pounds, the island monarchs are savage antagonists with the viciousness and vitality of a wounded grizzly bear.

These fighting animals are not native to the island or the neighboring mainland. They were introduced to Santa Cruz following the establishment of Spanish colonies in the channel islands in 1542.

Since that time, the hogs have degenerated to the same state of viciousness as that of the wild boar of central Europe. They have fearsome heads, high, bristling shoulders and knife-like tusks.

Elusive in open country, the Santa Cruz boar is hunted with dogs and heavy rifles.

Exploring CALIFORNIA'S MANSION *of* MYSTERY

by

DEAN S. JENNINGS

Neighborhood children call this house "haunted," for behind its modest exterior lies a wonderland of beautiful interiors and strange devices which work mechanical marvels.

Guarded by weird figures, doors open and a mighty organ plays on command in a house of mystery presided over by a brilliant scientist and a beautiful, lifelike robot princess of ancient Egypt.

THE neighborhood kids call it the "haunted house."

It stands forlornly on the street, its corroded brown front and ominously shaded windows dusty and forbidding amidst a splash of fine homes and apartment citadels in one of San Francisco's exclusive residential districts.

It isn't "haunted," of course.

But behind its door lies mystery, with a hollow-eyed wizard wielding a magic wand.

For inside the house there are hand-carved portals that open at a command, unseen flutes wafting dreamy melodies through the rooms every half hour, an organ that plays on an order from a human voice, a telephone that acts as a messenger and a woman robot that plays 3000 tunes on a zither.

The Mystery Mansion's Talented Master

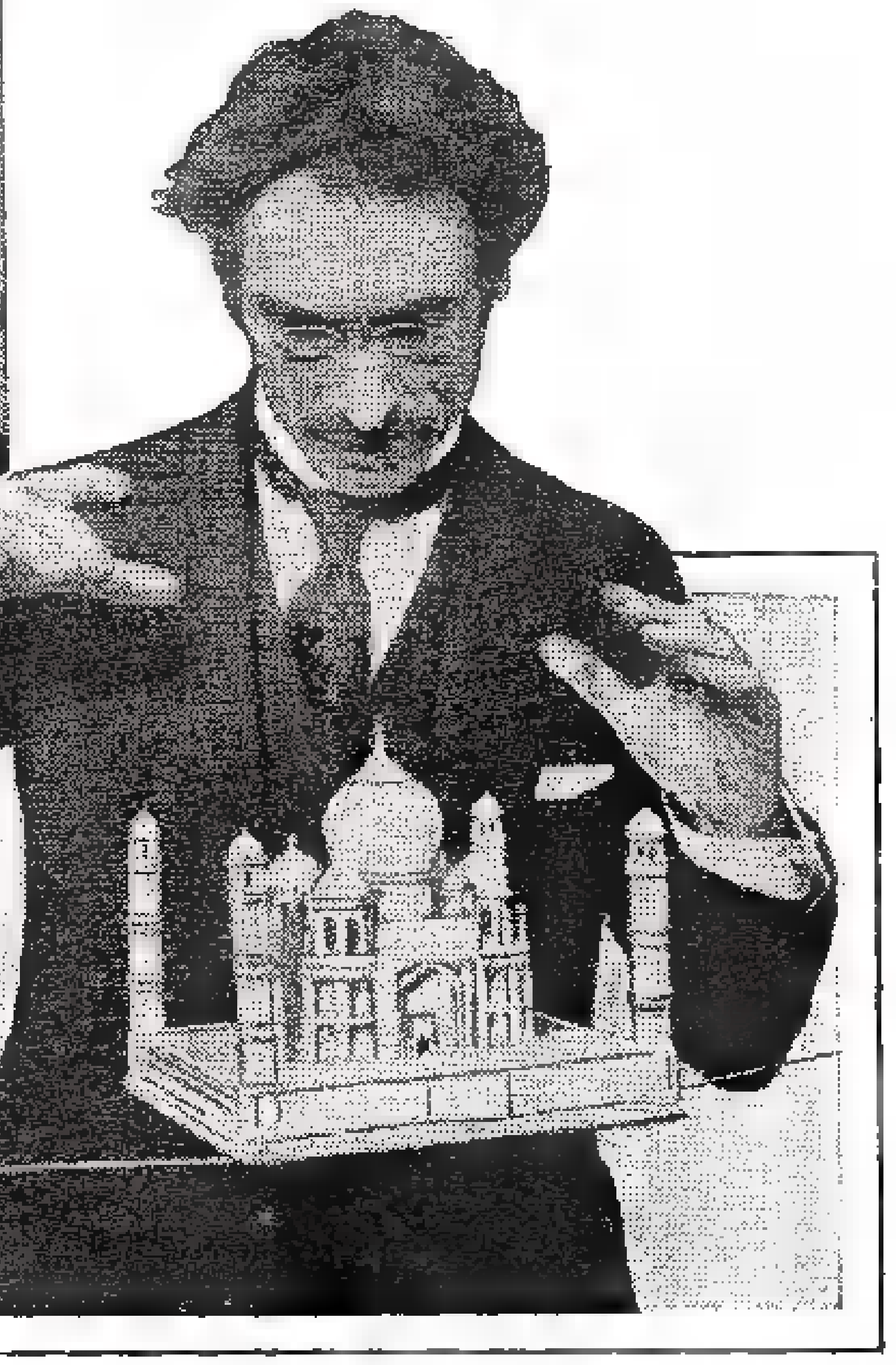
This strange house, unique in California, is the creation of Dr. Cecil Nixon, inventive genius and mental giant who lives on a diet of science. For many years he has toiled with no thought of financial gain, sleeping little and working long hours both day and night.

A few years ago Dr. Nixon was listening to an organ concert.

"I must have an organ in my house," he said.

But good organs are expensive. Hence Dr. Nixon trudged to the public library, obtained all available text books on the art of organ building—and made one himself!

Today the mighty instrument occupies a great part of the Nixon basement and is the marvel of San Francisco's leading organists who declare that its delicate tone is unsurpassed by professional work. Yet Dr. Nixon has gone still further. By installing a number of microphones and an ingenious system of mechanical control, the organ is made to play at a spoken command.



Dr. Nixon, owner of the mystery house, demonstrates one of his illusions—the suspension in mid air of a miniature Taj Mahal. The cord, visible in the picture, has been passed below the model to show that nothing supports it.

Organ-building, however, is only one phase of Dr. Nixon's amazing versatility. If he is ill, he treats himself, for he has mastered medicine, has a thorough knowledge of pharmacy and compounds his own prescriptions.

If he has a toothache, he goes to his own office, for he is a graduate of dentistry.

If the house needs wiring, Dr. Nixon is a qualified electrician.

If the house requires alterations, his complete knowledge of architecture and building construction comes to the fore.

Rooms and the hallway on the ground floor are of museum beauty, sometimes somber, yet cathedral-like in tone. Walls and ceilings are rare woods, hand-carved by Dr. Nixon with excruciating detail. The doors, exquisite portraits of wood design entirely hand-made, would excite a connoisseur. Dr. Nixon has applied sculptural ability to the fashioning of gargoyle heads in several rooms and a reproduction in bronze of a Parthenon frieze. Even the floors are inlaid in a delicate pattern.

Some of the gargoyles have discs concealed in their mouths. The voice, acting on a platinum point which in turn controls a gear arrangement under the floor, will open and close the doors in mystifying manner.

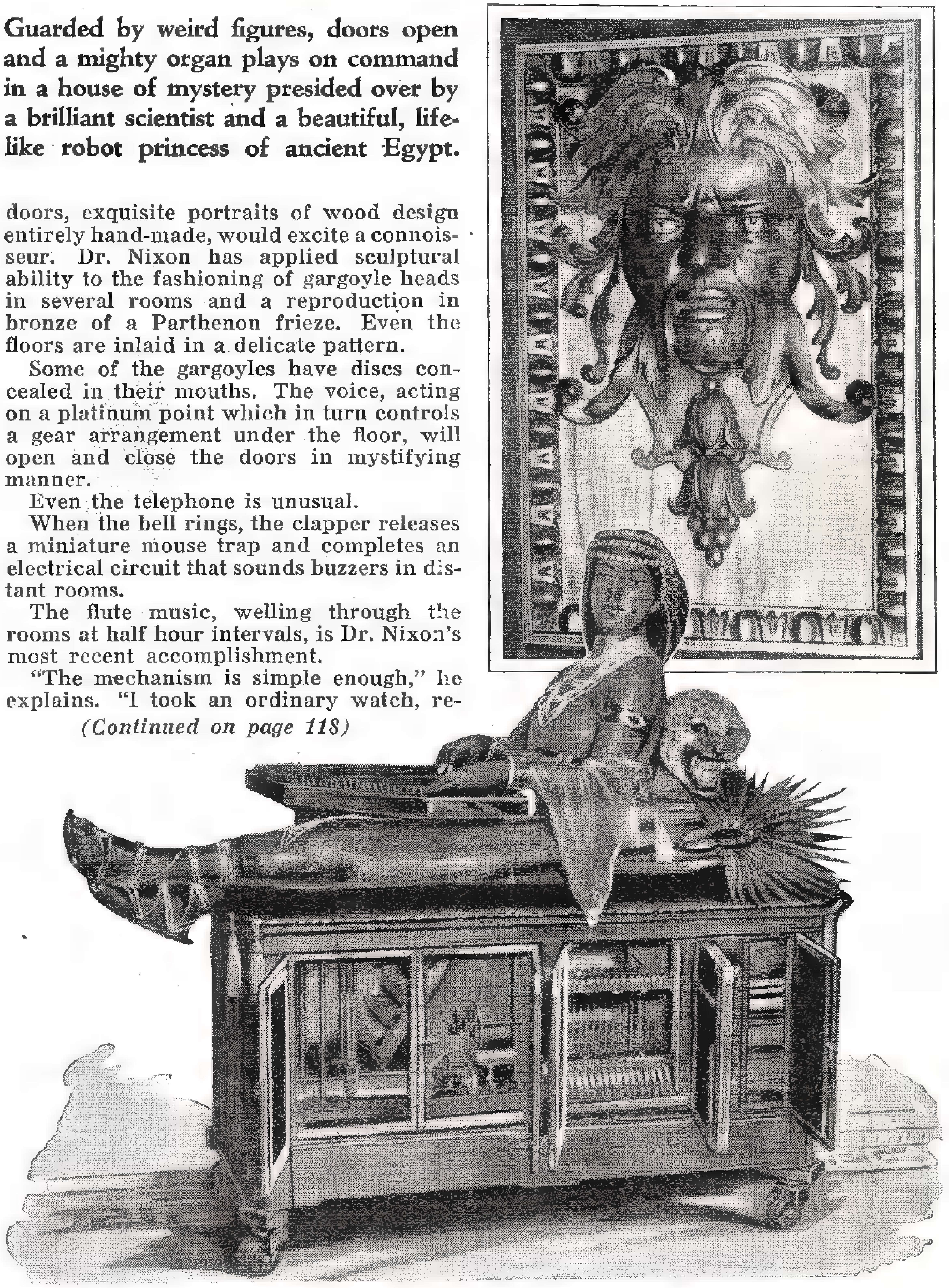
Even the telephone is unusual.

When the bell rings, the clapper releases a miniature mouse trap and completes an electrical circuit that sounds buzzers in distant rooms.

The flute music, welling through the rooms at half hour intervals, is Dr. Nixon's most recent accomplishment.

"The mechanism is simple enough," he explains. "I took an ordinary watch, re-

(Continued on page 118)



Upper photo shows one of the gargoyles carved by Dr. Nixon upon his doors. A disc in the gargoyle's mouth opens the door at sound of a human voice. Lower photo—Isis, queen of the mystery mansion, who plays three thousand tunes upon the zither at a spoken command, plucking out each note with an individual stroke of the metal picks in her hands

Talk on 5 METER WAVES with M-M TRANSMITTER

Hold phone conversations with friends on lakes, at camp, or in the city, as far as ten miles away, with this compact but powerful ultra-short wave combined transmitter and receiver.

by THOMAS A. BLANCHARD

ONLY a few years ago radio transmission on the five meter band was a rare thing. Today ultra-short wave sets are giving hundreds of fans a chance to operate their own transmitters and enjoy the thrills of amateur radio without putting out hundreds of dollars for equipment.

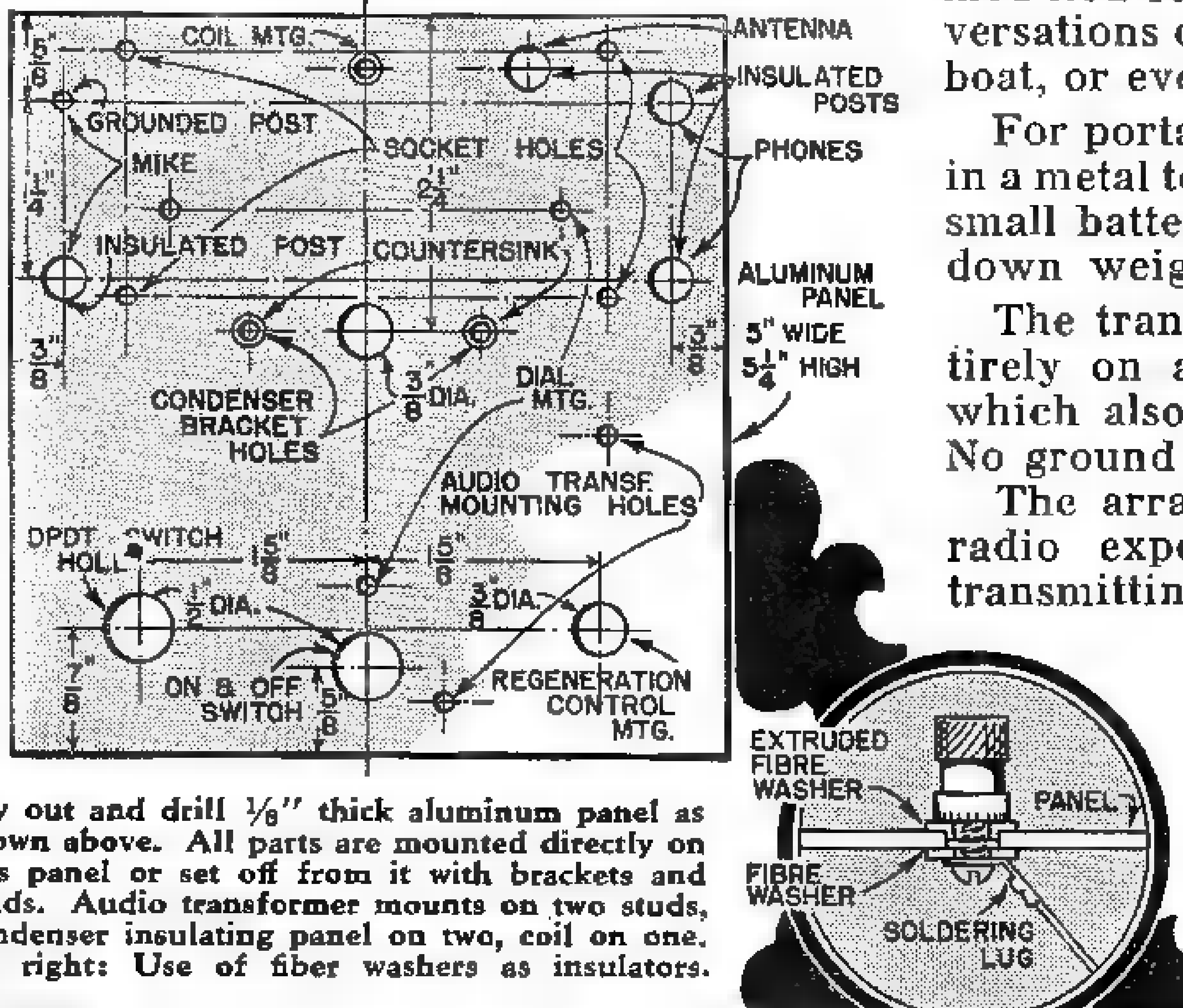
Designed especially for MODERN MECHANIX AND INVENTIONS readers, this 5-meter combination transmitter and receiver can be built from standard parts for about $5. Many fans will be able to salvage parts from old battery receivers. The tubes, batteries, headphone set, and carbon microphone complete the setup.

Actually we have here a private telephone system, with a range up to ten miles. With one set at home or camp, and another mounted for portable use, telephonic conversations can be carried on from your car, boat, or even while hiking.

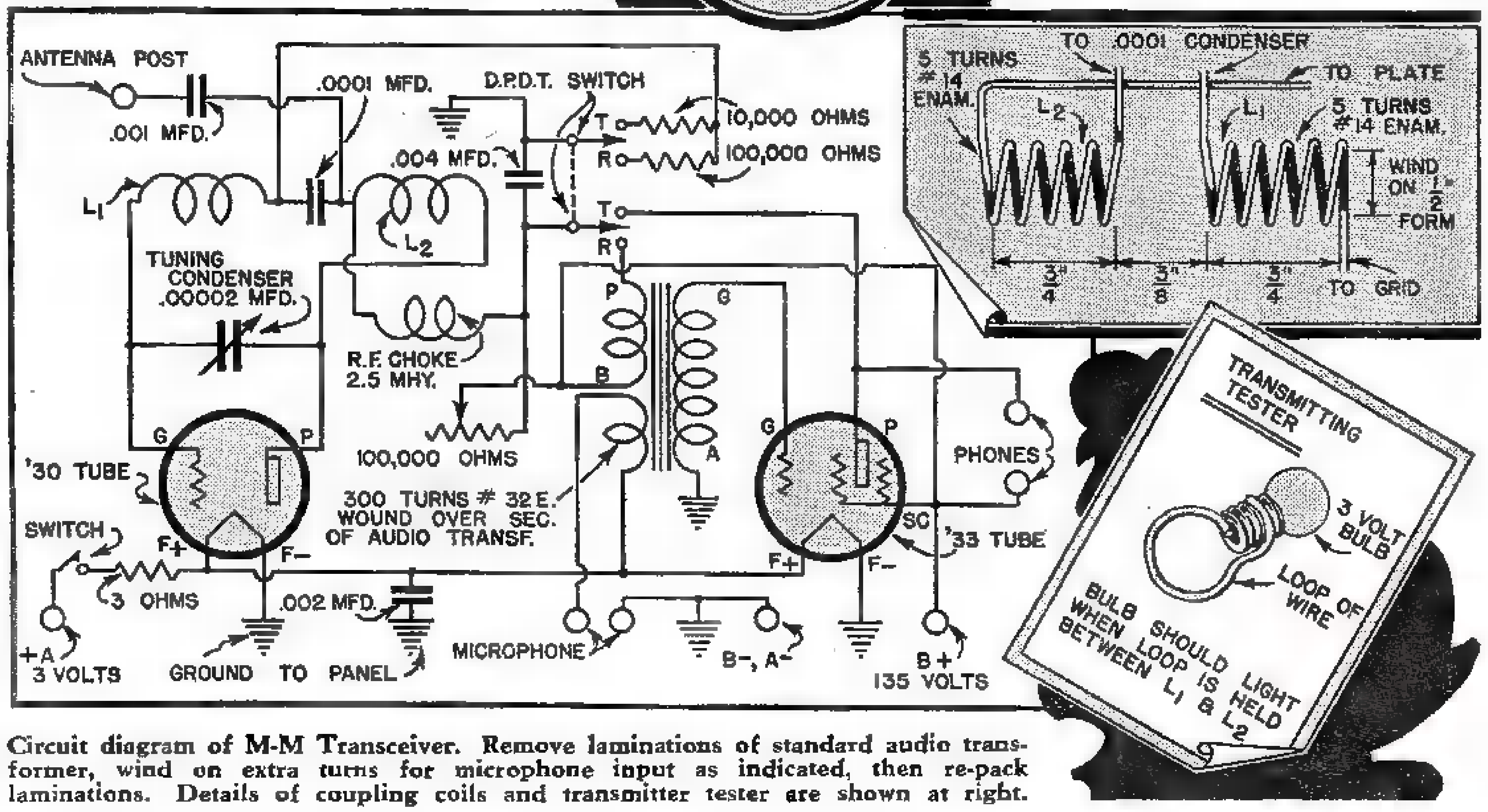
For portable use the set may be mounted in a metal tool box or overnight bag. Special small batteries should then be used to cut down weight.

The transmitter-receiver is mounted entirely on an aluminum panel 5¼" x 5", which also serves as chassis and ground. No ground wire is used.

The arrangement of parts is novel, but radio experimenters will recognize the transmitting unit as a split Colpitts circuit modulated by a '33 pentode. With the switch thrown for receiving, the '33 tube becomes a stage of audio frequency and the transmitter a receiver operating very much like a super-regenerative set.


COIL MTG.
ANTENNA
INSULATED POSTS
GROUNDED POST
MIKE
SOCKET HOLES
PHONES
INSULATED POST
COUNTERSINK
ALUMINUM PANEL
5" WIDE
5¼" HIGH
CONDENSER BRACKET HOLES
3/8 DIA.
DIAL MTG.
AUDIO TRANSF. MOUNTING HOLES
DPDT SWITCH HOLE
1 5/8"
1/2 DIA.
3/8 DIA.
ON & OFF SWITCH
REGENERATION CONTROL MTG.
EXTRUDED FIBRE WASHER
PANEL
FIBRE WASHER
SOLDERING LUG

Lay out and drill ⅛" thick aluminum panel as shown above. All parts are mounted directly on this panel or set off from it with brackets and studs. Audio transformer mounts on two studs, condenser insulating panel on two, coil on one. At right: Use of fiber washers as insulators.


ANTENNA POST
.001 MFD.
.0001 MFD.
D.P.D.T. SWITCH
10,000 OHMS
100,000 OHMS
.004 MFD.
L1
L2
TUNING CONDENSER .00002 MFD.
R.F. CHOKE 2.5 MHY.
100,000 OHMS
'30 TUBE
G
P
B
A
T
R
300 TURNS # 32 E. WOUND OVER SEC. OF AUDIO TRANSF.
SWITCH
F+
F−
3 OHMS
.002 MFD.
+A 3 VOLTS
GROUND TO PANEL
MICROPHONE
B−, A−
PHONES
SC
'33 TUBE
B+ 135 VOLTS
5 TURNS #14 ENAM.
TO .0001 CONDENSER
TO PLATE
WIND ON 1/2" FORM
3/4"
3/8"
TO GRID
TRANSMITTING TESTER
3 VOLT BULB
LOOP OF WIRE
BULB SHOULD LIGHT WHEN LOOP IS HELD BETWEEN L1 & L2

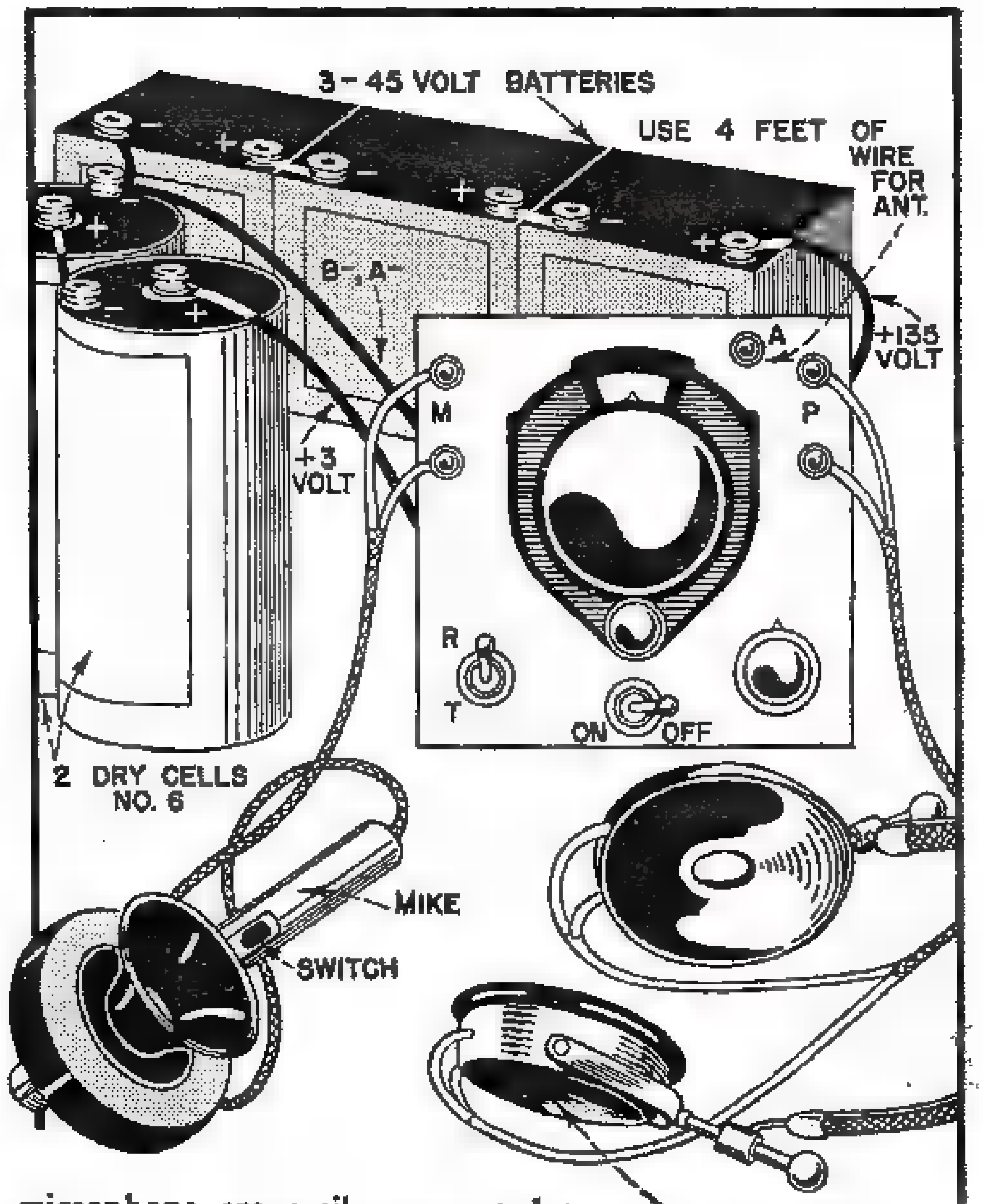
Circuit diagram of M-M Transceiver. Remove laminations of standard audio transformer, wind on extra turns for microphone input as indicated, then re-pack laminations. Details of coupling coils and transmitter tester are shown at right.

Microphone and audio transformers have been combined to save space by winding between 250 and 300 turns of No. 32 enameled copper wire over the secondary winding of an ordinary audio frequency transformer. If desired, a manufactured transformer serving exactly the same purpose can be had for around one dollar.

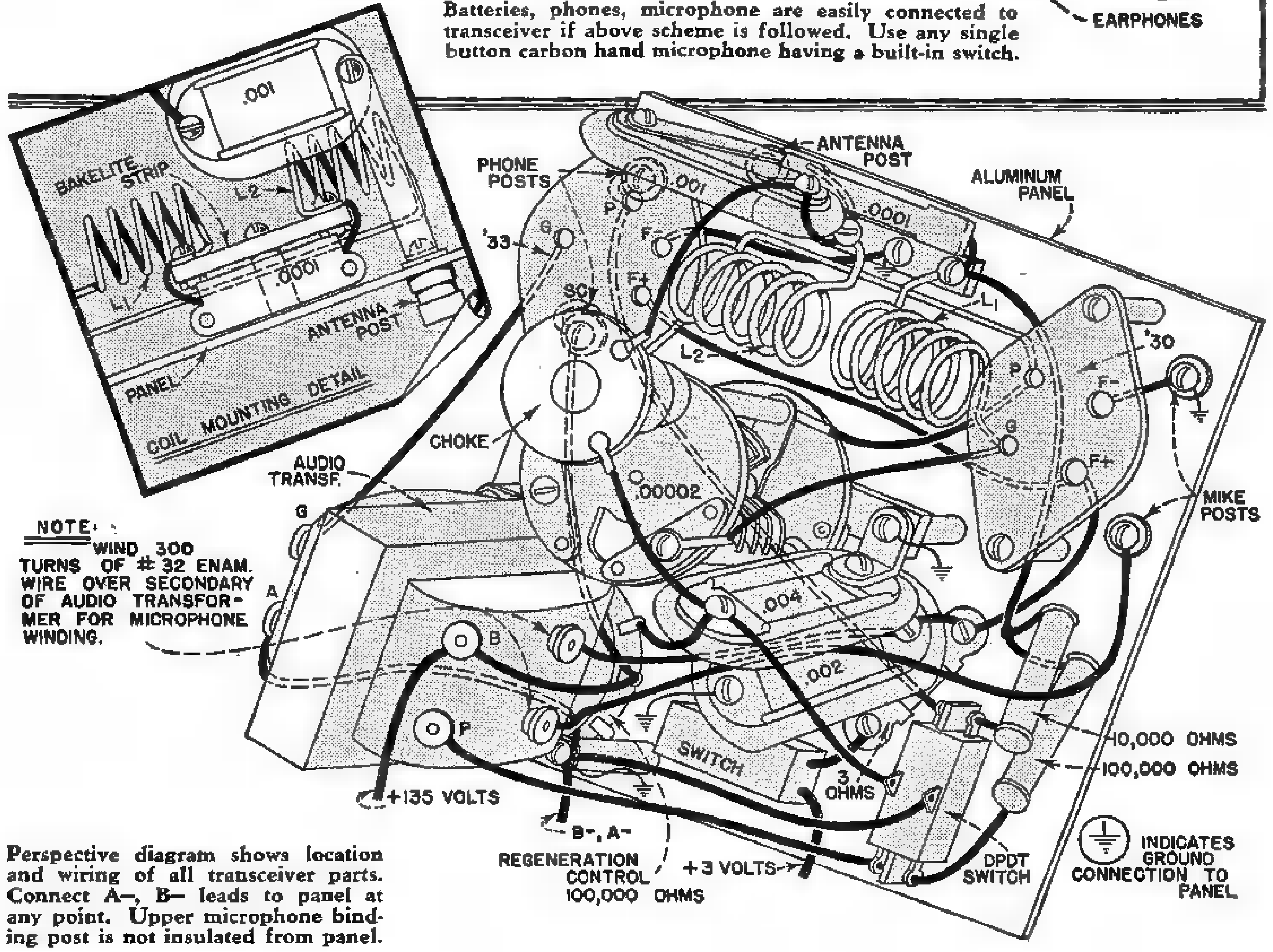
The transformer and tube sockets are mounted on metal or fiber studs to eliminate body capacity. The small tuning condenser is mounted on a strip of bakelite which in turn is held away from the panel by studs. This condenser should be no larger than 20 mmf. (.00002) in order that the set will tune down low enough; this size generally will have seven plates. Sockets are of the wafer type, mounted as shown, with the coils located between.

The coils are wound with No. 14 or No. 12 plain or enameled copper wire. Both coils have 5 turns wound on a ½" dowel or pipe form. When removed from the form the coils will open slightly, giving the correct finished inside diameter of about ⅝". Spread out the windings to leave about ⅛" space between each turn.

(Continued on page 122)


3-45 VOLT BATTERIES
USE 4 FEET OF WIRE FOR ANT.
B-, A-
+135 VOLT
+3 VOLT
M
A
P
R
T
ON
OFF
2 DRY CELLS NO. 6
MIKE
SWITCH
EARPHONES

Batteries, phones, microphone are easily connected to transceiver if above scheme is followed. Use any single button carbon hand microphone having a built-in switch.


.001
BAKELITE STRIP
L2
L1
.0001
ANTENNA POST
PANEL
COIL MOUNTING DETAIL
PHONE POSTS
ANTENNA POST
ALUMINUM PANEL
'33
G
P
F−
F+
SC
L1
L2
'30
CHOKE
AUDIO TRANSF.
.00002
NOTE: WIND 300 TURNS OF # 32 ENAM. WIRE OVER SECONDARY OF AUDIO TRANSFORMER FOR MICROPHONE WINDING.
A
B
.004
.002
MIKE POSTS
SWITCH
3 OHMS
10,000 OHMS
100,000 OHMS
+135 VOLTS
B−, A−
REGENERATION CONTROL 100,000 OHMS
+3 VOLTS
DPDT SWITCH
INDICATES GROUND CONNECTION TO PANEL

Perspective diagram shows location and wiring of all transceiver parts. Connect A–, B– leads to panel at any point. Upper microphone binding post is not insulated from panel.

Enjoy THRILLS of FOOTBALL WITH "VARSITY JR." GAME

by J. R. JOHNSTON

Every play of football is possible with this thrilling new gameboard. Plays are called, dice thrown, results read off from charts, and the football moved as chart indicates.

PLAYS FOR OFFENSE						
Punts	Punt Out of Bounds Quick Kick	Lateral Pass	Dice Numbers	Short Pass	Medium Pass	Intercepted Pass and Kick Returns
40	50	N	11	C-8	C-16	8
45D	44	C-30	12	N-9	N-14	0
35	36	N	13	I-11	N-12	3
47	29	C-41	14	C-10	C-21	7
39	35	N	15	N-6	I-18	9
43D	17	N	16	C-7-9	N-16	F
BL	62	C-33	21	I-9	C-15	70
37	48	I	22	N-3	N-22	9
26	BL-5L	C-12	23	N-7	I-14	11
41D	40	C-47	24	C-10	C-24	7
64	49	I	25	C-4	N-17	0
45D	38	N	26	N-10	C-17-71	1
35	40	C-16	31	C-8	N-19	6
52	BL	F	32	F	I-23	RTD
BL-4G	51	C-21	33	C-9	C-24	9
35	44	N	34	N-5	N-6	31
47	37	I	35	C-7-TD	C-13	0
40	41	N	36	N-7	F	4
36	40	C-8	41	C-11	N-15	7
17	F	5L	42	I-8	I-21	0
44	P-5	C-91	43	C-5-21	C-24	3
36	33	N	44	N-10	C-19	55
45	47	I	45	I-9	I-14	0
30	BL-6G	FR-6L	46	N-5	C-21-17	3
40	36	I	51	C-5	N-16	8
BL-TD	43	C-7	52	N-6	I-21	6
35	59	N	53	C-11	N-15	2
41D	35	C-13	54	N-4	P-25	R7YL
FR	46	N	55	C-3	18L	9
30	34	N	56	I-5	C-24	0
51	40	C-R1YL	61	N-8	N-21	0
62	32	N	62	P-5	N-13	F
F	30	I	63	I-7	C-24	27
P-15	BL-TD	C-23	64	C-8	C-20	5
43	46	P-15	65	N-6	I-13	7
48D	BL	C-18	66	C-10	C-22	0

Playing charts can be cut out and pasted on stiff cardboard.

THIS football game has been so simplified that even a ten year old boy can play it. In spite of its simplicity, however, every standard play of a real football game is provided, from straight line plunges and end runs to tricky lateral and forward passes.

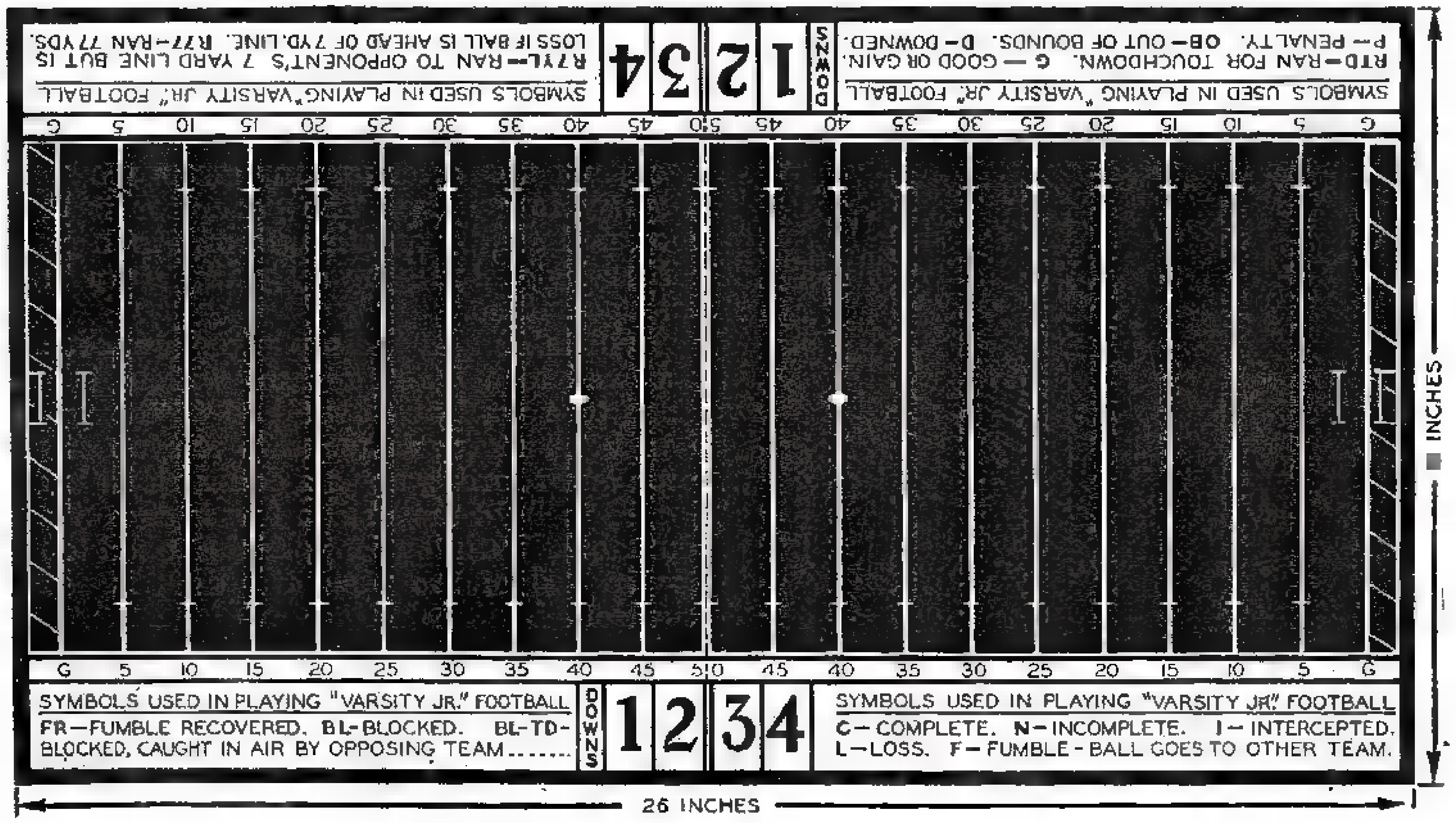
In perfecting the game, statistics of every standard play in 100 college games were studied and averaged, to form a basis for determining gains or losses. Because of this, we believe the game conforms more closely to actual football than any other on the market.

So accurate are the play charts that it is possible to kick a 55-yard field goal, close to the record for the longest goal ever made from the field. It is possible to complete a long pass for a gain of 56 yards, also close to the record. Likewise, a pass into the end zone can be completed for a touchdown, or intercepted and run back 50, 77 or 100 yards, the latter resulting in a touchdown. Thrills and "breaks" are just as prominent as in any real game.

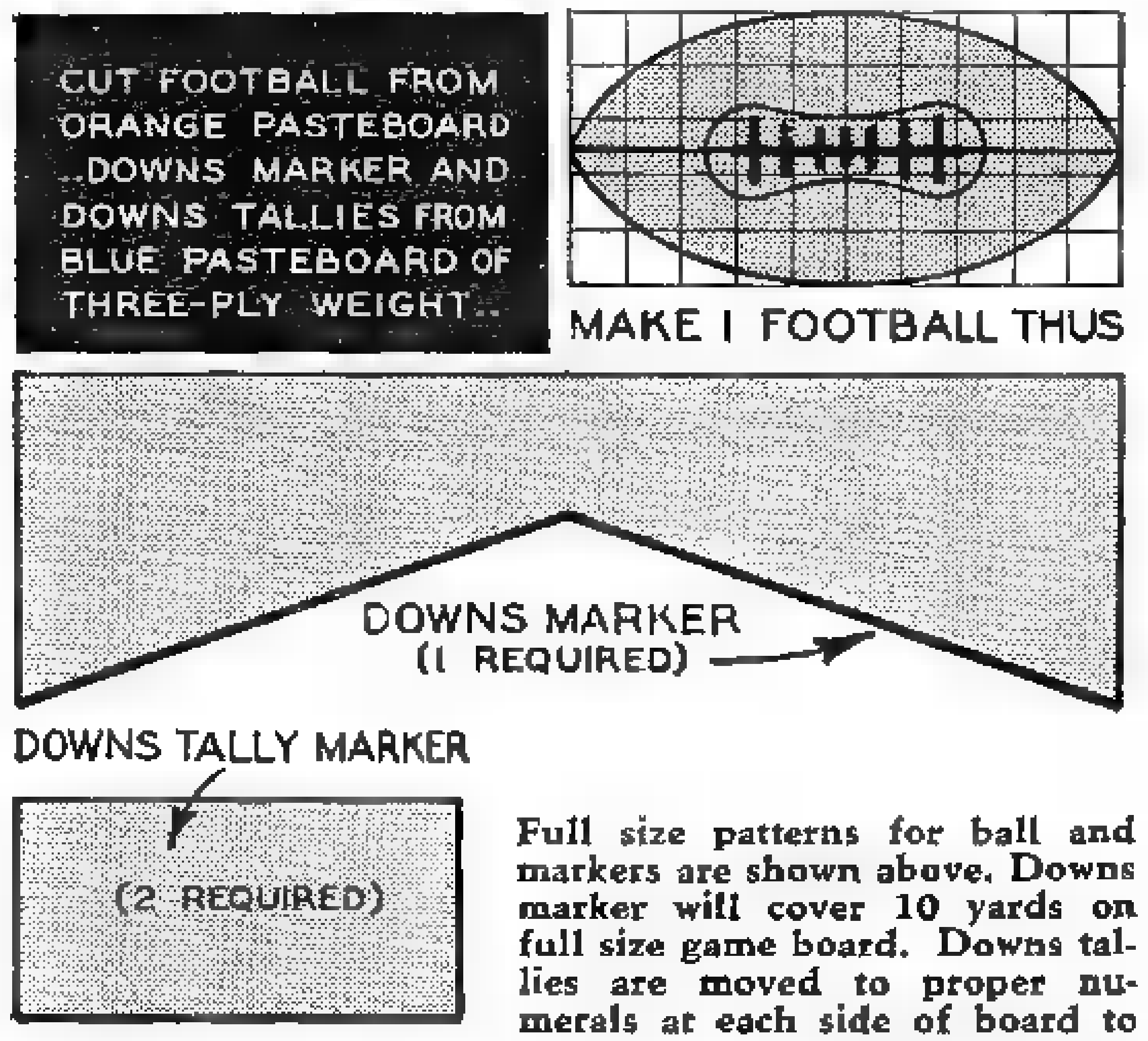
The game costs practically nothing to make, and takes little space. It consists of a 26″x15″ miniature gridiron, two charts of plays, a football, downs markers, and a pair of dice. The charts are cut out and pasted on cards so that each player or "team" has a set of plays and results to call off. Fifteen columns are provided in the charts, two of which are for dice numbers. The 13 remaining columns contain figures for 16 different plays, with the field goal kicking formation being used for points after touchdowns.

With an alarm clock set to mark 5, 10 or 15 minute periods, whichever desired, the game proceeds like an actual football contest. Choice of goal and kickoff is determined by a throw of the dice, high winning. The dice are of different color, the red in every case showing tenths, the other hundredths. Thus, on the kickoff from the 40

(Continued on page 120)


SYMBOLS USED IN PLAYING "VARSITY JR." FOOTBALL
P—PENALTY. OB—OUT OF BOUNDS. D—DOWNED.
RTD—RAN FOR TOUCHDOWN. G—GOOD OR GAIN.
DOWNS
1 2 3 4
SYMBOLS USED IN PLAYING "VARSITY JR." FOOTBALL
R7YL—RAN TO OPPONENT'S 7 YARD LINE BUT IS LOSS IF BALL IS AHEAD OF 7 YD. LINE. R77—RAN 77 YDS.
G 5 10 15 20 25 30 35 40 45 50 45 40 35 30 25 20 15 10 5 G
SYMBOLS USED IN PLAYING "VARSITY JR." FOOTBALL
FR—FUMBLE RECOVERED. BL-BLOCKED. BL-TD-BLOCKED, CAUGHT IN AIR BY OPPOSING TEAM.......
DOWNS
1 2 3 4
SYMBOLS USED IN PLAYING "VARSITY JR." FOOTBALL
C—COMPLETE. N—INCOMPLETE. I—INTERCEPTED.
L—LOSS. F—FUMBLE-BALL GOES TO OTHER TEAM.
15 INCHES
26 INCHES

Layout of gridiron for football game. Spaces between white lines may be further divided into individual yard lines. Grid should be laid out on white paper, painted green where black above, with numerals in red or black, and sheet then pasted down evenly on light plywood.


CUT FOOTBALL FROM ORANGE PASTEBOARD ..DOWNS MARKER AND DOWNS TALLIES FROM BLUE PASTEBOARD OF THREE-PLY WEIGHT..
MAKE 1 FOOTBALL THUS
DOWNS MARKER (1 REQUIRED)
DOWNS TALLY MARKER
(2 REQUIRED)

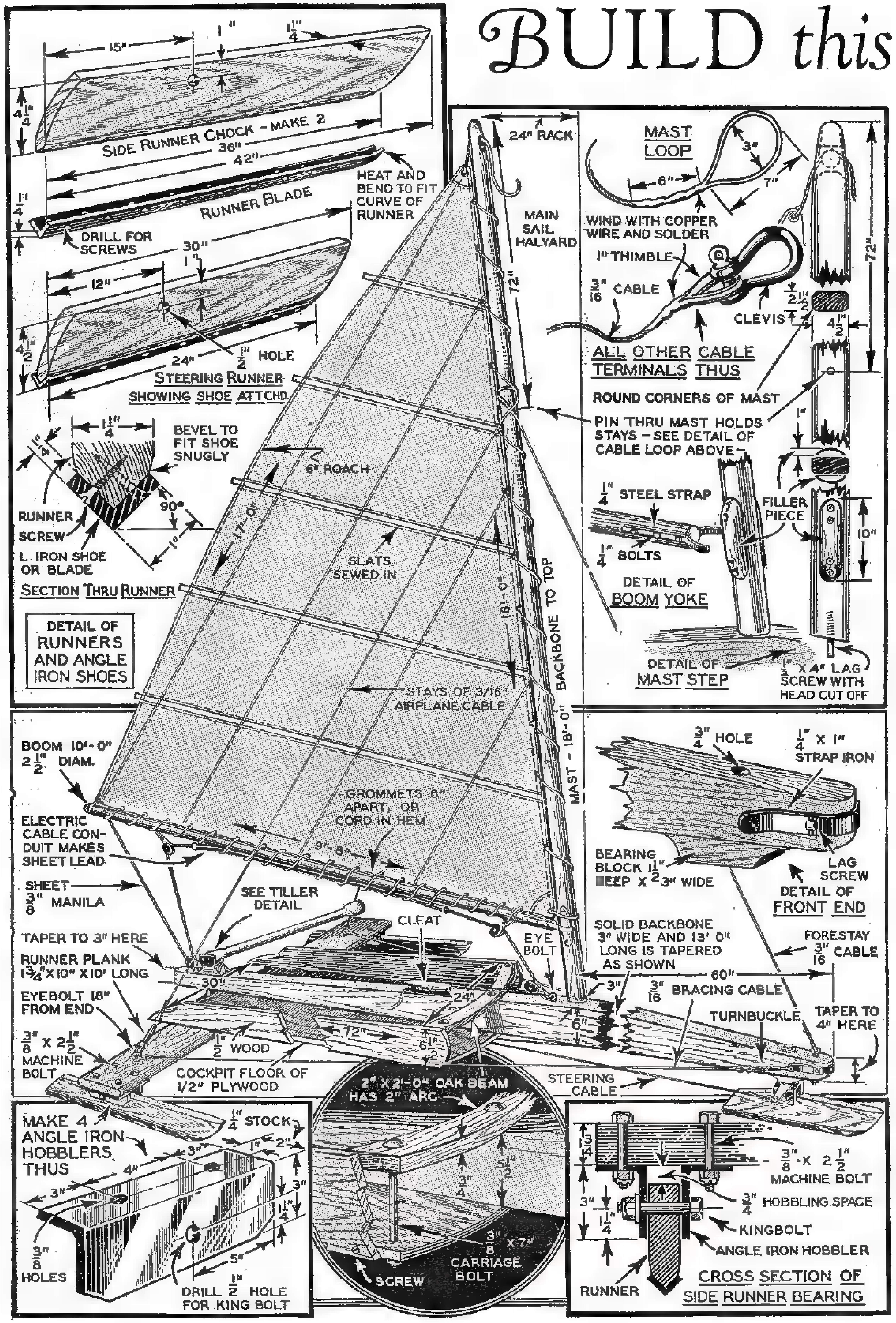
Full size patterns for ball and markers are shown above. Downs marker will cover 10 yards on full size game board. Downs tallies are moved to proper numerals at each side of board to indicate correct number of down.

PLAYS FOR OFFENSE							
Long Pass	End Zone Pass	Kickoff & Free Kick	Dice Numbers	Line Buck	End Run	Fair Catch	Field Goal Kick for Point
I-35	C	50	11	1	6	G	G-15
C-32	N	45	12	0	3	G	G-45
N-39	C	40	13	3	0	G	WIDE
I-30	N	48	14	2	0	F	G-5
C-31	N	55	15	0	4	G	G-20
N-41	C	40	16	7	1	G	G-15
C-30	N	35	21	4	8L	G	G-9
N-36	C	56	22	F-R	5	F	LOW
F	N	35	23	0	3	G	G-50
C-25	N	45	24	1	0	G	BL
N-27	N	39	25	0	1	F-R	G-5
N-30	IRTD	45	26	3	4	G	WIDE
C-25	N	24	31	2	0	G	G-25
I-26	7L	65	32	0	33	G	G-20
N-25	C	47	33	2	9	F	WIDE
N-50	N	54	34	0	0	G	LOW
C-48	N	40	35	1	16	G	G-40
N-40	C	58	36	4L	0	G	WIDE
8L	N	50	41	3	1	G	G-12
C-40	C	52	42	5	6	F	G-35
N-42	F	43	43	0	P-5	G	WIDE
I-40	5L	45	44	F	7	F-R31	G-40
FR6L	C	57	45	0	1	G	LOW
C-40	N	41	46	3	3	G	G-30
I-25	N	30	51	8	5L	G	G-48
C-37	N	55	52	0	F	G	F
N-29	I-R50	45	53	1	1	F	G-33
P-15	N	40	54	1L	RTD	G	WIDE
I-40	C	OB	55	3	0	G	G-40
N-32	N	62	56	RTD	3	F	G-25
C-37	N	38	61	0	8	G	BL
N-41	C	50	62	6	41	G	G-40
C-56	C	40	63	4	0	G	G-55
I-25	C	48	64	7	3L	G	BL6L
N-33	18L	39	65	1	10	G	WIDE
C-29	I-R77	40	66	0	7	F	G-40

Call offensive plays from these charts, then throw dice.

BUILD this *Front-Steering* ICEBOAT

by JULIUS J. FANTA


15"
1"
1¼"
4¼"
SIDE RUNNER CHOCK - MAKE 2
36"
42"
HEAT AND BEND TO FIT CURVE OF RUNNER
¼"
RUNNER BLADE
DRILL FOR SCREWS
30"
1"
12"
4½"
24"
½" HOLE
STEERING RUNNER SHOWING SHOE ATTCHD
1¼"
BEVEL TO FIT SHOE SNUGLY
RUNNER
SCREW
L. IRON SHOE OR BLADE
90°
1"
SECTION THRU RUNNER
DETAIL OF RUNNERS AND ANGLE IRON SHOES
24" RACK
MAST LOOP
3"
6"
7"
WIND WITH COPPER WIRE AND SOLDER
1" THIMBLE
3/16" CABLE
CLEVIS
ALL OTHER CABLE TERMINALS THUS
72"
2½"
4½"
ROUND CORNERS OF MAST
PIN THRU MAST HOLDS STAYS - SEE DETAIL OF CABLE LOOP ABOVE
1"
¼" STEEL STRAP
FILLER PIECE
10"
¼" BOLTS
DETAIL OF BOOM YOKE
DETAIL OF MAST STEP
¼" X 4" LAG SCREW WITH HEAD CUT OFF
MAIN SAIL HALYARD
72"
6" ROACH
17'-0"
SLATS SEWED IN
16'-0"
BACKBONE TO TOP
MAST - 18'-0"
STAYS OF 3/16" AIRPLANE CABLE
GROMMETS 6" APART, OR CORD IN HEM
9'-8"
BOOM 10'-0" 2½" DIAM.
ELECTRIC CABLE CONDUIT MAKES SHEET LEAD
SHEET 3/8" MANILA
SEE TILLER DETAIL
CLEAT
EYE BOLT
TAPER TO 3" HERE
RUNNER PLANK 1¾"X10" X10' LONG
30"
24"
EYEBOLT 18" FROM END
3/8" X 2½" MACHINE BOLT
½" WOOD
72"
6½"
COCKPIT FLOOR OF 1/2" PLYWOOD
3"
60"
3/16" BRACING CABLE
6"
TURNBUCKLE
TAPER TO 4" HERE
STEERING CABLE
¾" HOLE
¼" X 1" STRAP IRON
BEARING BLOCK 1½" DEEP X 3" WIDE
LAG SCREW
DETAIL OF FRONT END
SOLID BACKBONE 3" WIDE AND 13' 0" LONG IS TAPERED AS SHOWN
FORESTAY 3/16" CABLE
MAKE 4 ANGLE IRON HOBBLERS THUS
¼" STOCK
3"
4"
1"
2"
3"
1¼"
3/8" HOLES
5"
DRILL ½" HOLE FOR KING BOLT
2" X 2'-0" OAK BEAM HAS 2" ARC
5½"
¾"
3/8" X 7" CARRIAGE BOLT
SCREW
3"
1¼"
3/8" X 2½" MACHINE BOLT
¾" HOBBLING SPACE
KINGBOLT
ANGLE IRON HOBBLER
RUNNER
CROSS SECTION OF SIDE RUNNER BEARING

Assembly of front-steering iceboat is shown in center drawing, with construction details at sides. Professional sailmaker will make sails directly from above sail plan. After making backbone, first step is to put plywood cockpit floor in place, locating 10 inches from rear end. Light wooden slats are sewed into sail at approximately 2½-foot intervals.

THERE are three distinct advantages in building and sailing this front-steering iceboat. It is simple to build, costs less than $28 including sail, and most important of all, will not spin on the ice. Safety is the keynote, since this type cannot possibly spin out of control. With the rig scientifically balanced by the designers, capsizing is reduced to a minimum.

This forward runner craft, the latest thing in iceboats, is cat-rigged (one sail) and has 75 sq. feet of sail. It can easily be sailed at up to 50 miles an hour, perhaps more, in an 18 mile wind. Two persons can be carried in the cockpit and two more on the runnerplank adjoining it.

By carefully following instructions you will not only have a handsome boat, but one which will stand up for many years of thrilling winter sailing.

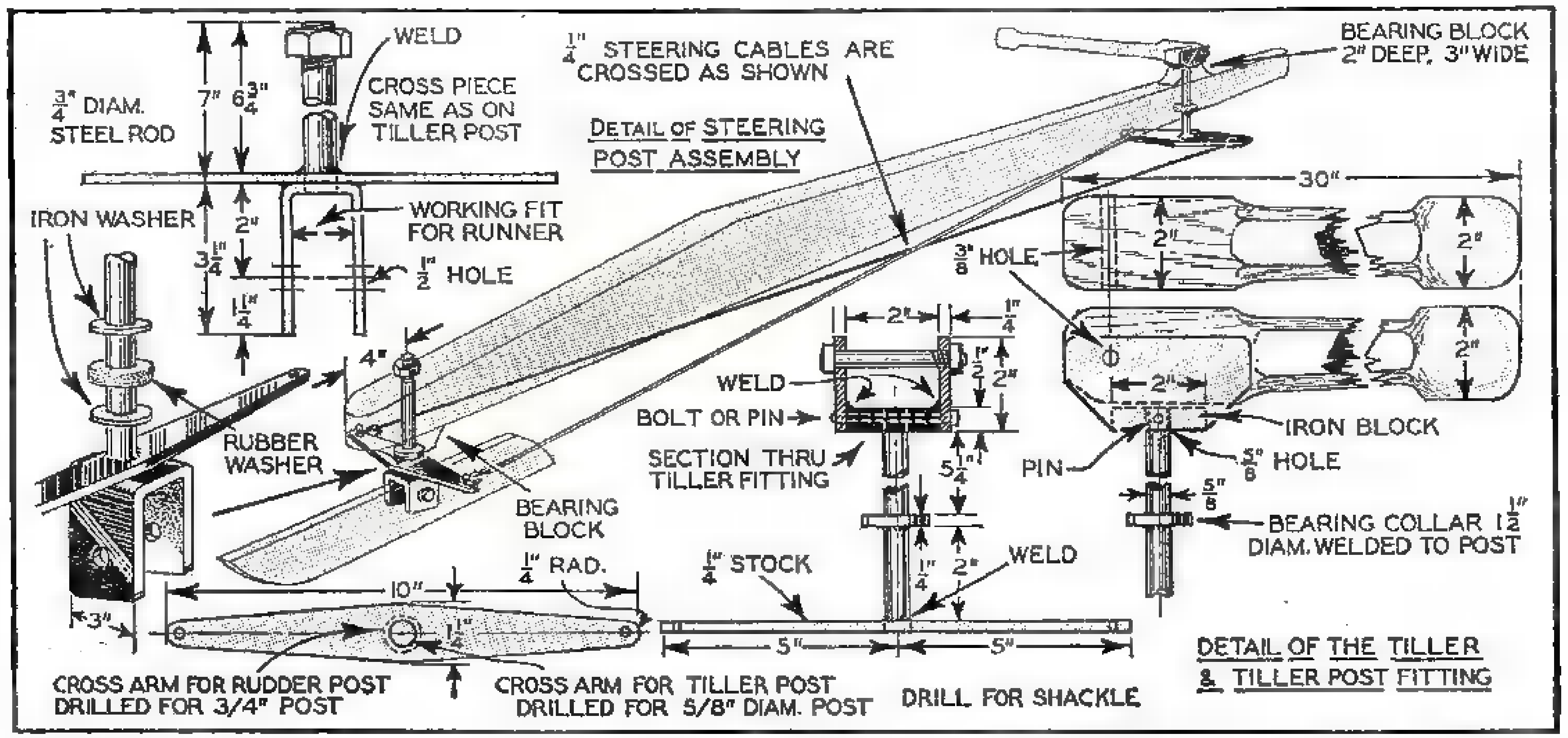
The use of clear, straight-grained spruce throughout is advised. If spruce is not obtainable, pine, but preferably fir may be substituted. Spruce and fir have greater strength and flexibility to absorb jarring on unsmooth ice. Use only brass screws when necessary to use screws. Nails should be avoided.

The plans show a criss-cross affair, the reverse of the more familiar Hudson River type which is steered with the rudder at the stern. A solid backbone 13'x6"x3" should be tapered at both ends from the maststep where greater thickness is needed to withstand the down-pressure of the mast. The runnerplank is 10' long, 10" wide and 1¾" thick. The mast measurements are 18'x4½"x2½"; it is raked or tilted aft two feet off perpendicular.

The bottom of the cockpit should be of half-inch plywood, 6 feet long, two feet

(Continued on page 126)

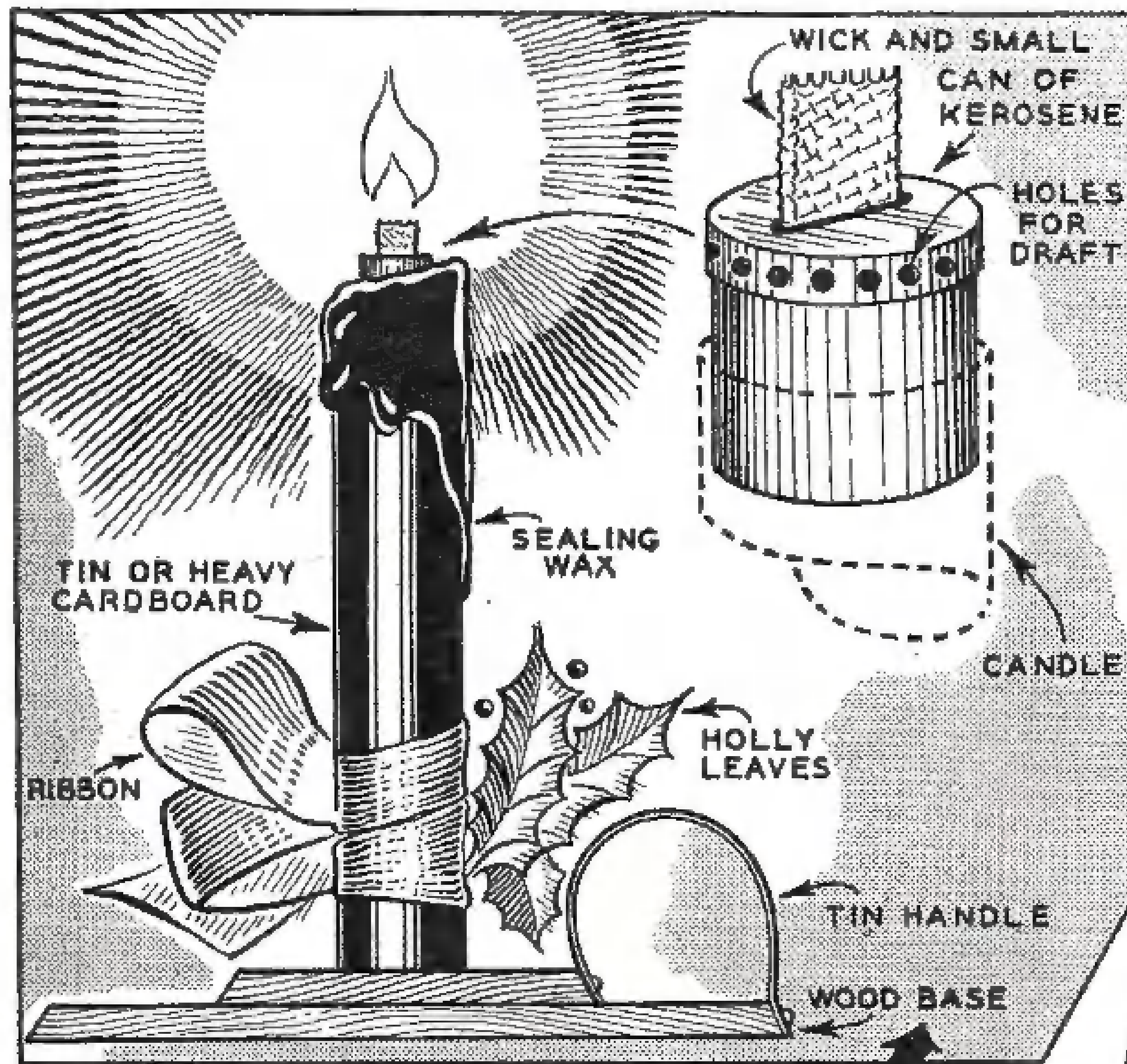
Here is the front-steering iceboat in action, skimming over ice before an 18-mile wind at 50 miles per hour. Slight changes were made in plans after this boat was tested.


¾" DIAM. STEEL ROD
7"
6¾"
WELD
CROSS PIECE SAME AS ON TILLER POST
¼" STEERING CABLES ARE CROSSED AS SHOWN
DETAIL OF STEERING POST ASSEMBLY
BEARING BLOCK 2" DEEP, 3" WIDE
IRON WASHER
2"
3¼"
1¼"
WORKING FIT FOR RUNNER
½" HOLE
30"
2"
3/8" HOLE
2"
¼"
WELD
1½"
BOLT OR PIN
SECTION THRU TILLER FITTING
5¼"
4"
RUBBER WASHER
BEARING BLOCK
¼" RAD.
¼" STOCK
2"
WELD
PIN
IRON BLOCK
5/8" HOLE
5/8"
BEARING COLLAR 1½" DIAM. WELDED TO POST
3"
10"
1"
5"
5"
CROSS ARM FOR RUDDER POST DRILLED FOR 3/4" POST
CROSS ARM FOR TILLER POST DRILLED FOR 5/8" DIAM. POST
DRILL FOR SHACKLE
DETAIL OF THE TILLER & TILLER POST FITTING

Rudder post and tiller details. Crossed steering cables are necessary with front-steering runner to permit tiller to move in same direction as operator on turns. Hardwood tiller swings up or down in bearing block, which in turn bolts to tiller post.

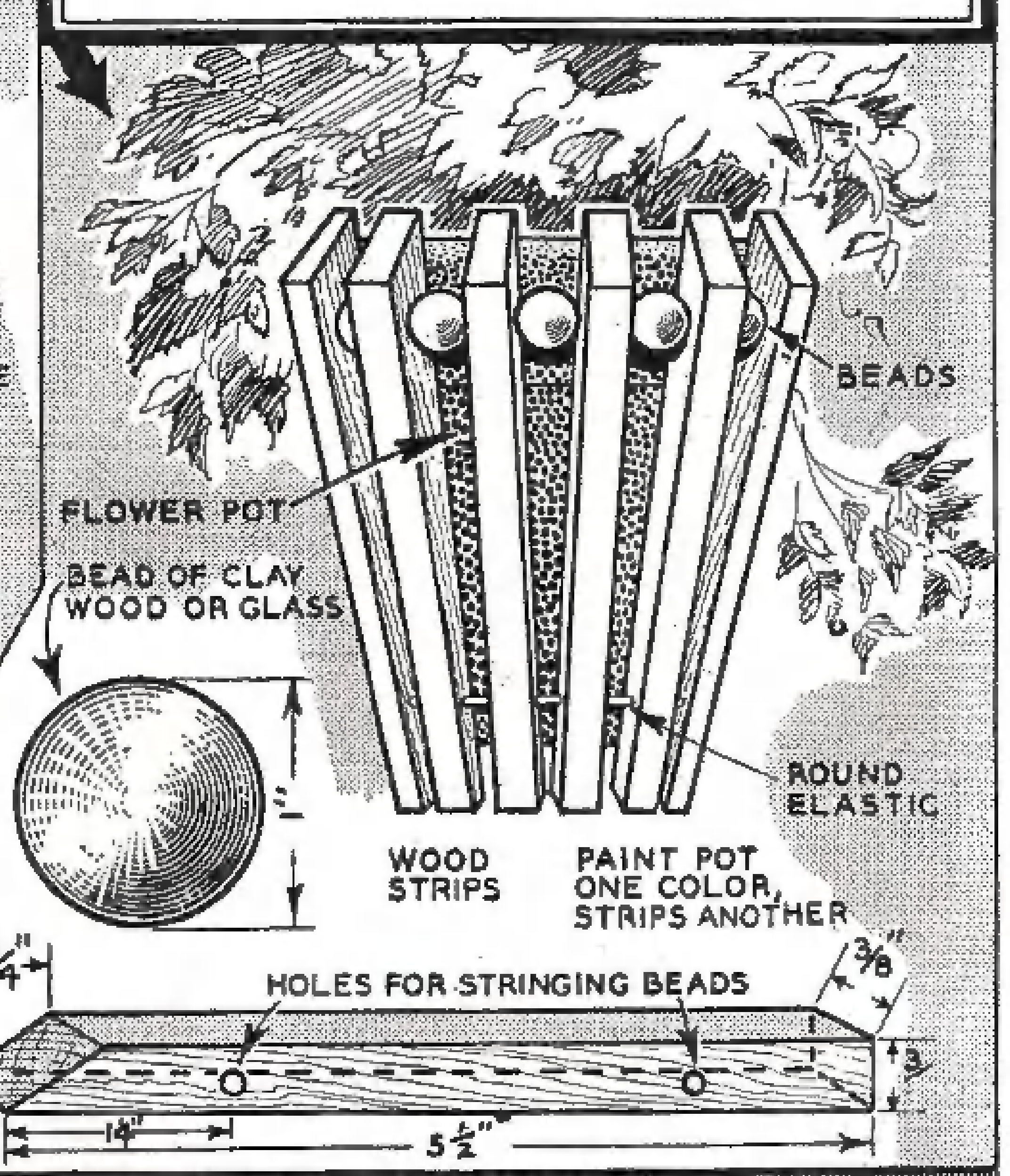
Six Novel SUGGESTIONS *for* CHRISTMAS GIFTS

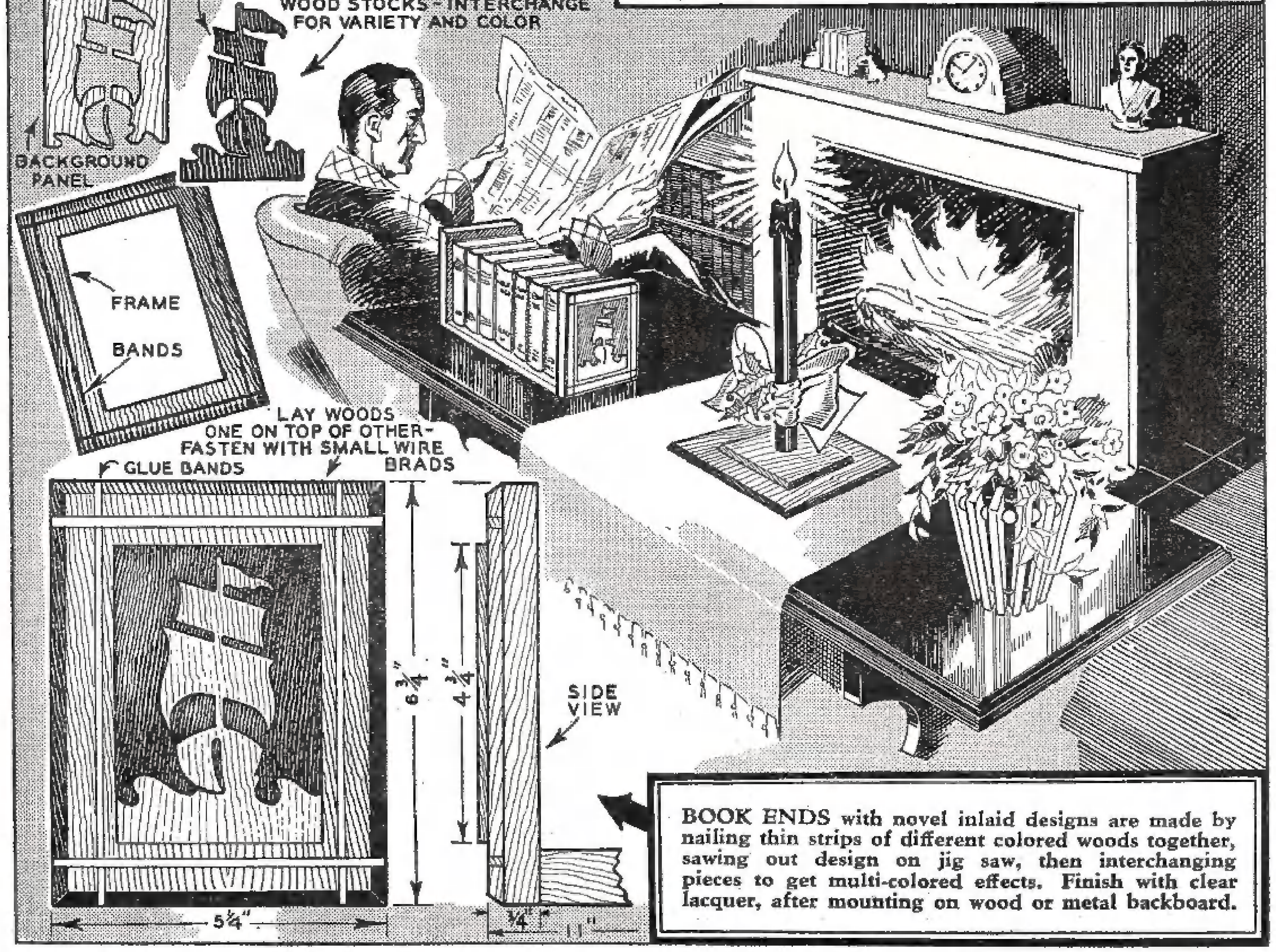
Add that personal touch to Christmas gifts this year by making them in your own workshop. Among the plans shown here are appropriate gifts for family or friends—and their cost will be very moderate. Finished in gay lacquer, they spread real holiday cheer to all.


WICK AND SMALL CAN OF KEROSENE
HOLES FOR DRAFT
SEALING WAX
TIN OR HEAVY CARDBOARD
CANDLE
HOLLY LEAVES
RIBBON
TIN HANDLE
WOOD BASE

EVERLASTING CANDLE burns for hours with bright flame, yet always is same height. Glue cardboard or tin cylinder 24" long by 4" thick to wood base, set in kerosene tin with wick, and finish in red enamel, ribbon, and white wax.

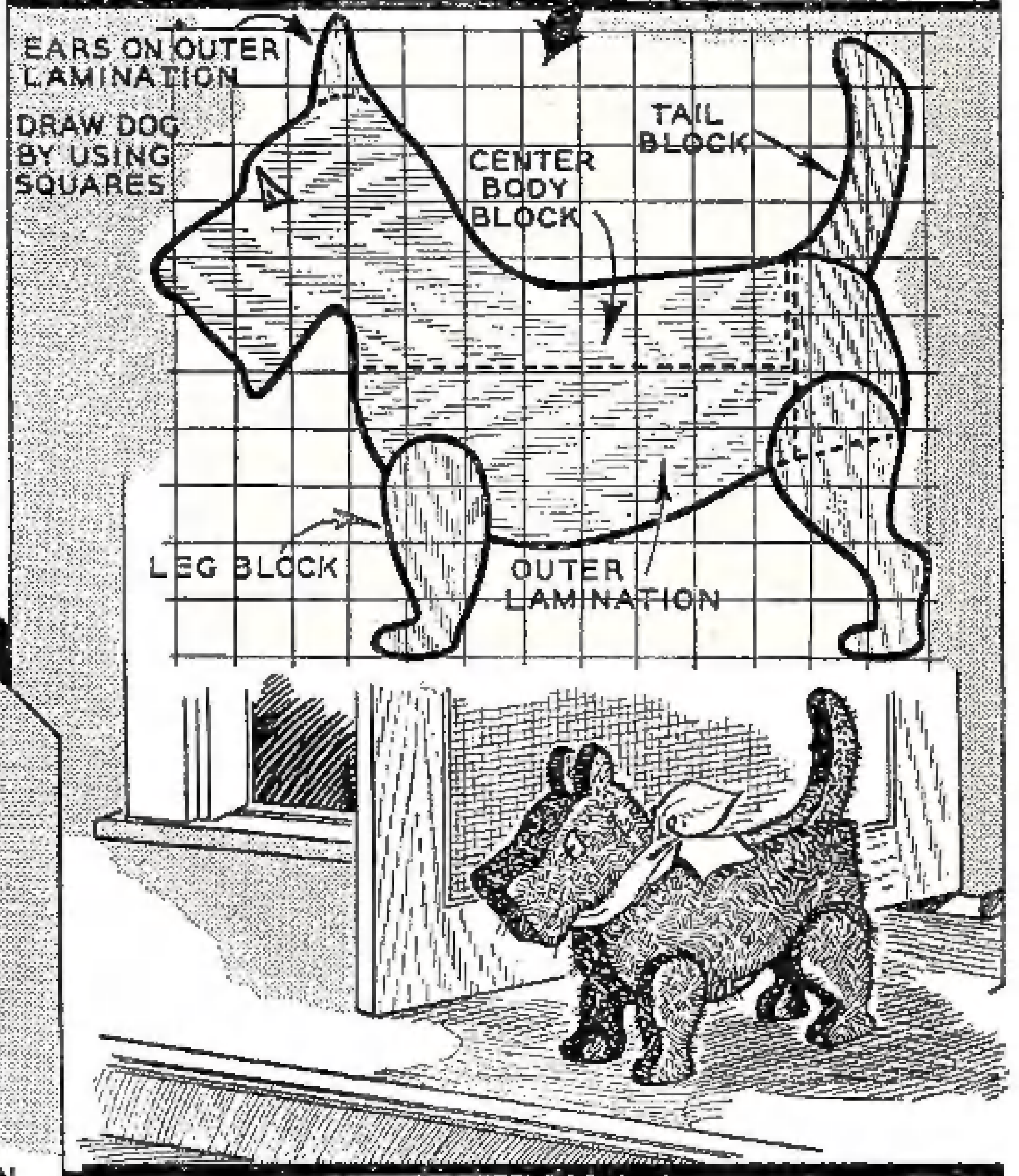
FLOWER POT COVER made from small pieces of wood will beautify unsightly clay pots, giving novel setting for any plant. Drill holes in carefully beveled wood strips, assemble with beads and elastic, and apply lacquer or paint.


BEADS
FLOWER POT
BEAD OF CLAY WOOD OR GLASS
ROUND ELASTIC
WOOD STRIPS
PAINT POT ONE COLOR, STRIPS ANOTHER
3/4"
3/8"
HOLES FOR STRINGING BEADS
1/4"
5 1/2"

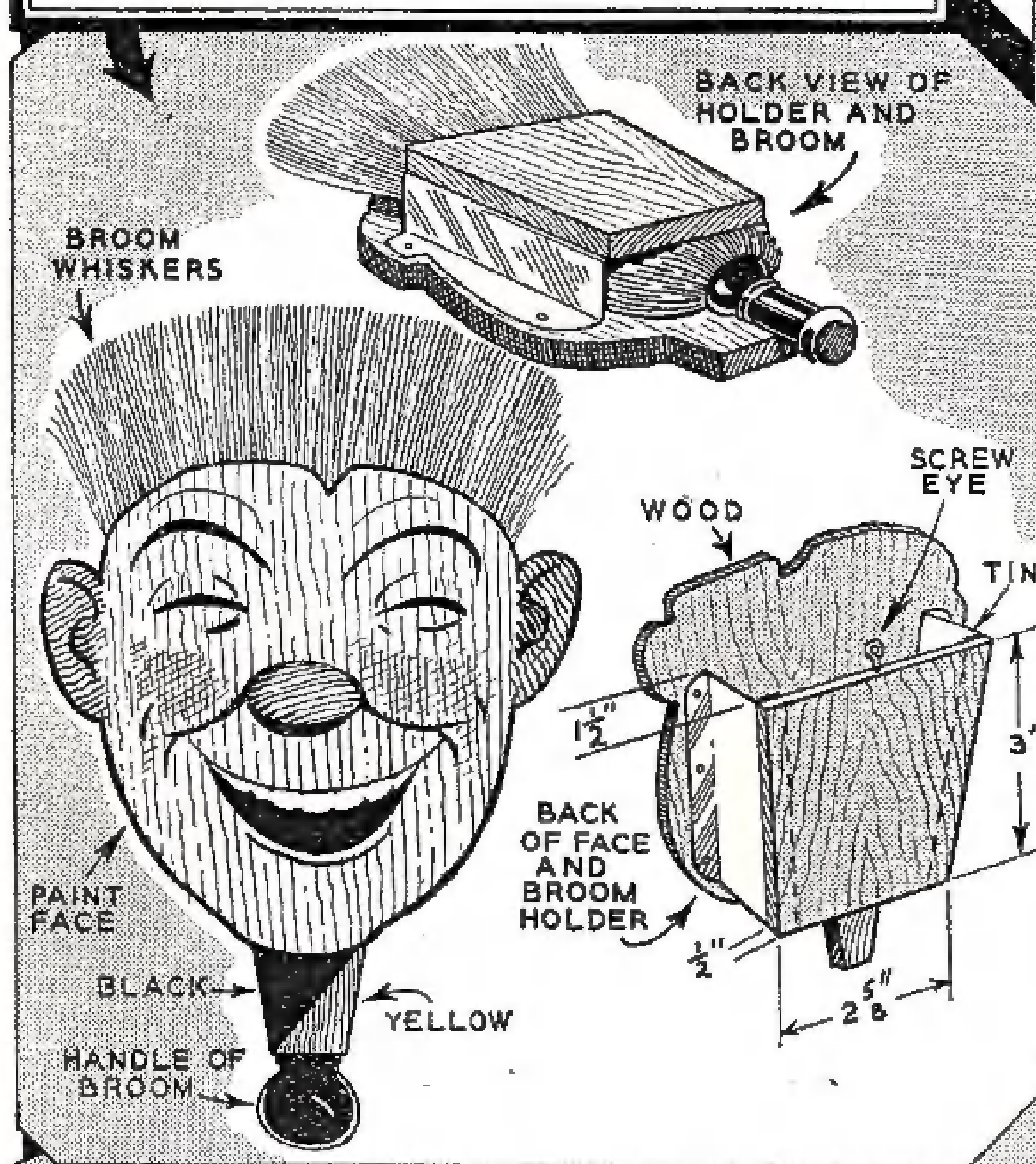

SHIP
CUT PARTS FROM 3 DIFFERENT WOOD STOCKS - INTERCHANGE FOR VARIETY AND COLOR
BACKGROUND PANEL
FRAME
BANDS
LAY WOODS ONE ON TOP OF OTHER-FASTEN WITH SMALL WIRE BRADS
GLUE BANDS
6 3/4"
4 3/4"
SIDE VIEW
5 1/4"
1/4"
1"

BOOK ENDS with novel inlaid designs are made by nailing thin strips of different colored woods together, sawing out design on jig saw, then interchanging pieces to get multi-colored effects. Finish with clear lacquer, after mounting on wood or metal backboard.

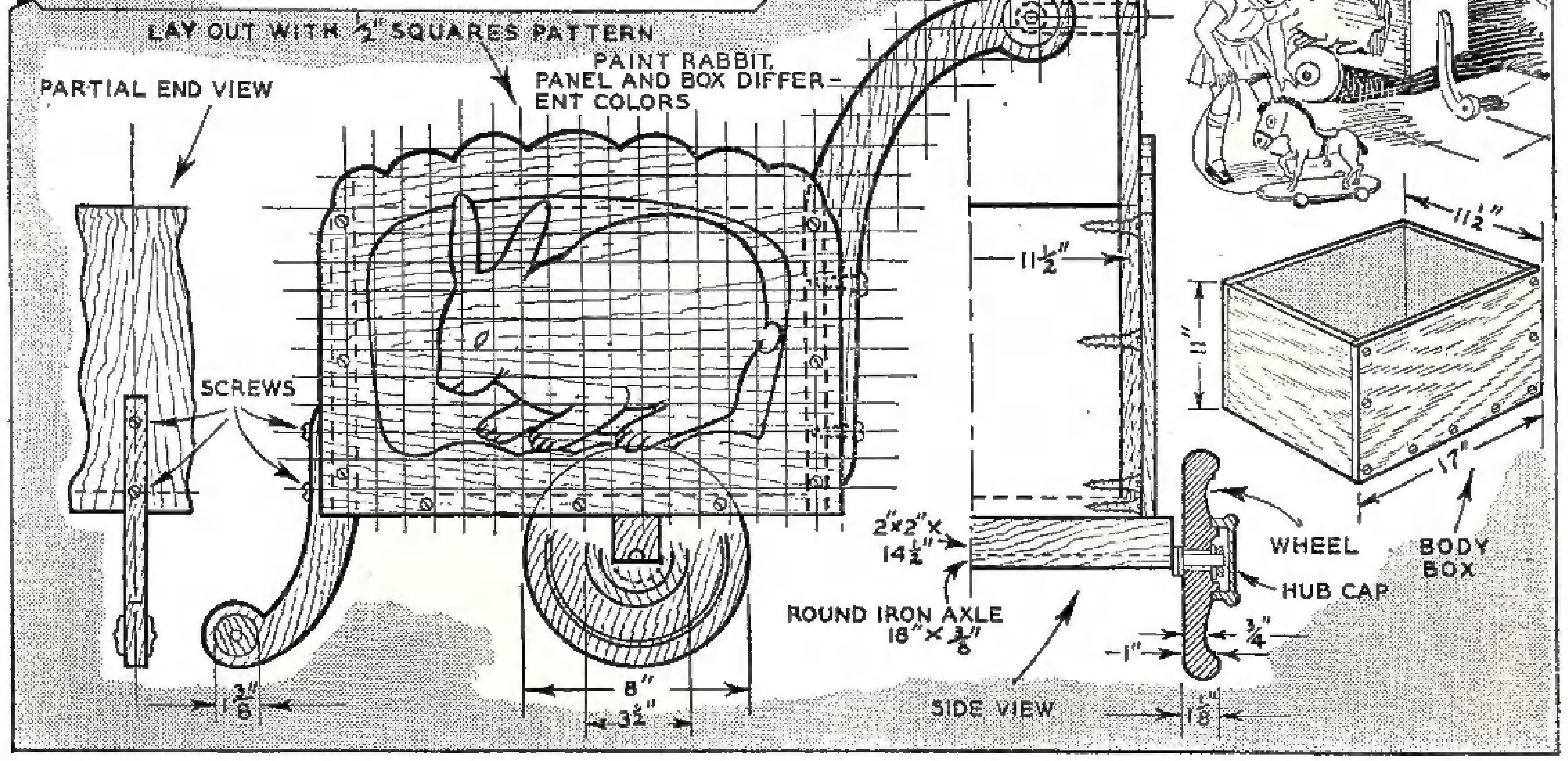
"SCOTTIE" DOOR STOP is cut from layers of plywood, then glued together and finished with heavy coat of plastic paint textured to represent fur.


EARS ON OUTER LAMINATION
DRAW DOG BY USING SQUARES
CENTER BODY BLOCK
TAIL BLOCK
LEG BLOCK
OUTER LAMINATION

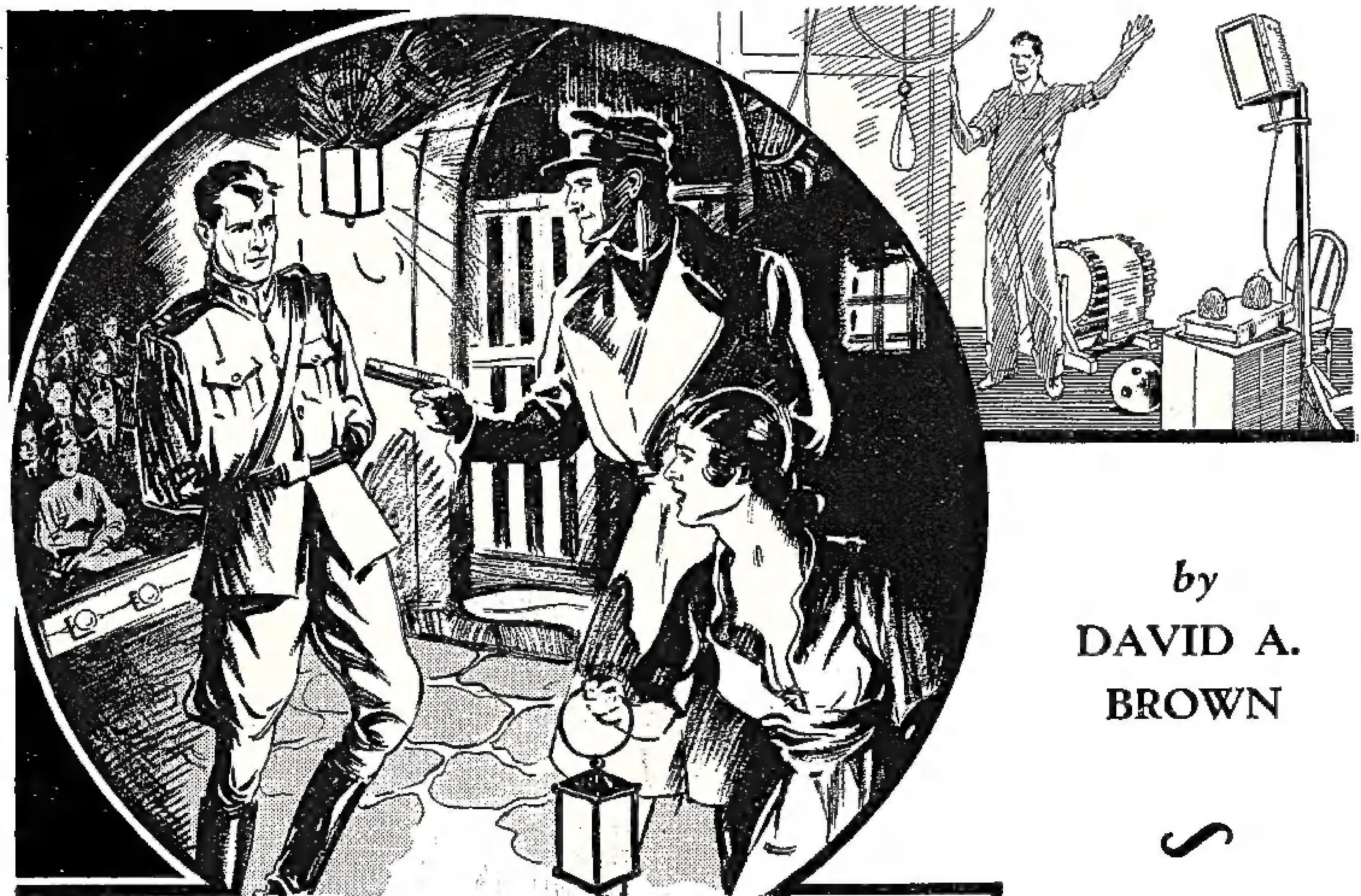
WHISK BROOM HOLDER with comic face brings many a chuckle from users. Paint features in with black paint, then add dashes of color to mouth, nose, and ears. Hang by screw eye on nail in wall.


BACK VIEW OF HOLDER AND BROOM
BROOM WHISKERS
WOOD
SCREW EYE
TIN
1 1/2"
3"
BACK OF FACE AND BROOM HOLDER
PAINT FACE
BLACK
YELLOW
1/2"
2 5/8"
HANDLE OF BROOM

TOY CART teaches little children to make rounds of house, picking up toys at end of day. Plywood overlays in animal designs are glued to sides of cart, then painted. Wheels are turned from pine or hardwood, then fitted with bushings. Assemble with wood screws.


HAND ROD
LAY OUT WITH 1/2" SQUARES PATTERN
PAINT RABBIT, PANEL AND BOX DIFFERENT COLORS
PARTIAL END VIEW
11 1/2"
11 1/2"
12"
SCREWS
17"
2"×2"× 14 1/2"
ROUND IRON AXLE 18"×3/8"
WHEEL
HUB CAP
BODY BOX
3/4"
1"
3/8"
8"
3 1/2"
SIDE VIEW
1/8"

SOUND EFFECT *Gadgets* *for the "Little* THEATER"

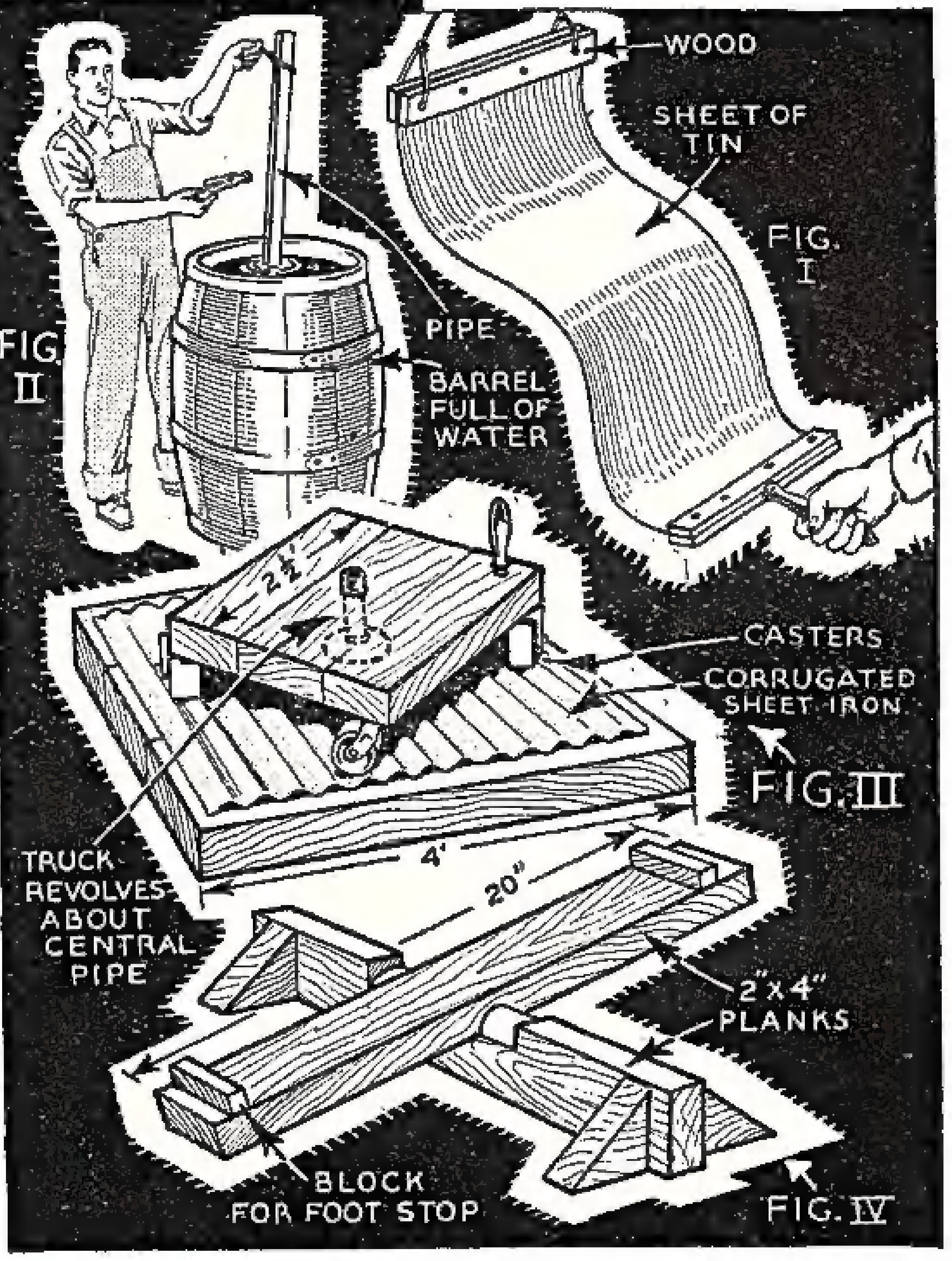


by

DAVID A. BROWN

Bizarre though they may seem, the devices described in this article with a little practice can be made to produce any off-stage sound effect for amateur theatricals.

Pictured below are devices used for producing back-stage thunder, chimes or fire bells, clicking of train wheels passing over rails, or sound of marching men.

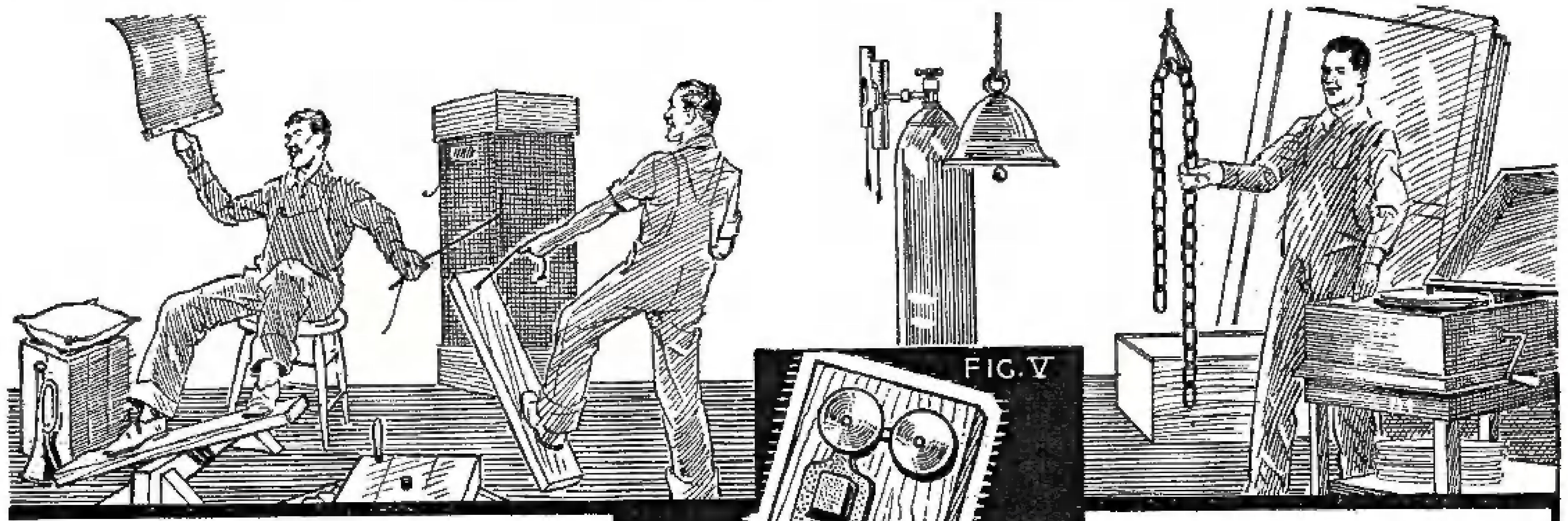

WOOD
SHEET OF TIN
FIG. I
FIG II
PIPE
BARREL FULL OF WATER
2½'
CASTERS
CORRUGATED SHEET IRON
FIG. III
4'
20"
TRUCK REVOLVES ABOUT CENTRAL PIPE
2"x4" PLANKS
BLOCK FOR FOOT STOP
FIG. IV

THIS equipment which to the layman may appear to be the invention of a lunatic is used regularly on the professional stage to obtain unusual sound effects. Continued use, however, has demonstrated how these weird devices can add realism to the average stage play.

Little theater groups should have these easily-made noisemakers among their stage equipment, for there is hardly a play written which does not call for the use of some of them.

The thunder sheet, Fig. 1, is shaken to produce the deep roll of thunder. It is made from a sheet of flexible copper or tin, both ends of which are held firmly with light wooden battens. One end is suspended overhead by ropes. A handle of wood or loop of rope makes it easier to operate.

For a loud clap of thunder, fire a blank shotgun shell into an empty barrel, or suspend a log chain by means of rope and pulley over an empty barrel across which is laid a sheet of galvanized iron. At the "cue" release the rope. The sound is deafening.



To make a set of chimes, suspend a brass pipe in a barrel of water. Raise and lower the pipe while tapping it with a hammer until the desired pitch is sounded. The water line is the point at which the pipe should be sawed. In this way several pipes may be suspended from a rack by rope, and tuned to form chimes, church, train or fire department bells. For loud ringing use a hammer, for softer tones a striker padded and covered with chamois.

For the sound of train wheels passing over rails use a truck, Fig. 3, mounted on steel casters, revolving on a base covered with corrugated iron roofing. The truck is 2½' square, the base 4' square. Cut a hole in the center of the roofing and screw a floor flange pipe socket to the base. Into this screw a section of pipe for the truck to revolve around. Merely cut a hole in the truck to fit the pipe and fasten a convenient handle at one corner for operating the truck.

As a train approaches, first sound a wooden train whistle and ring the bells. Come in with the steam exhaust by lightly

(Continued on page 132)

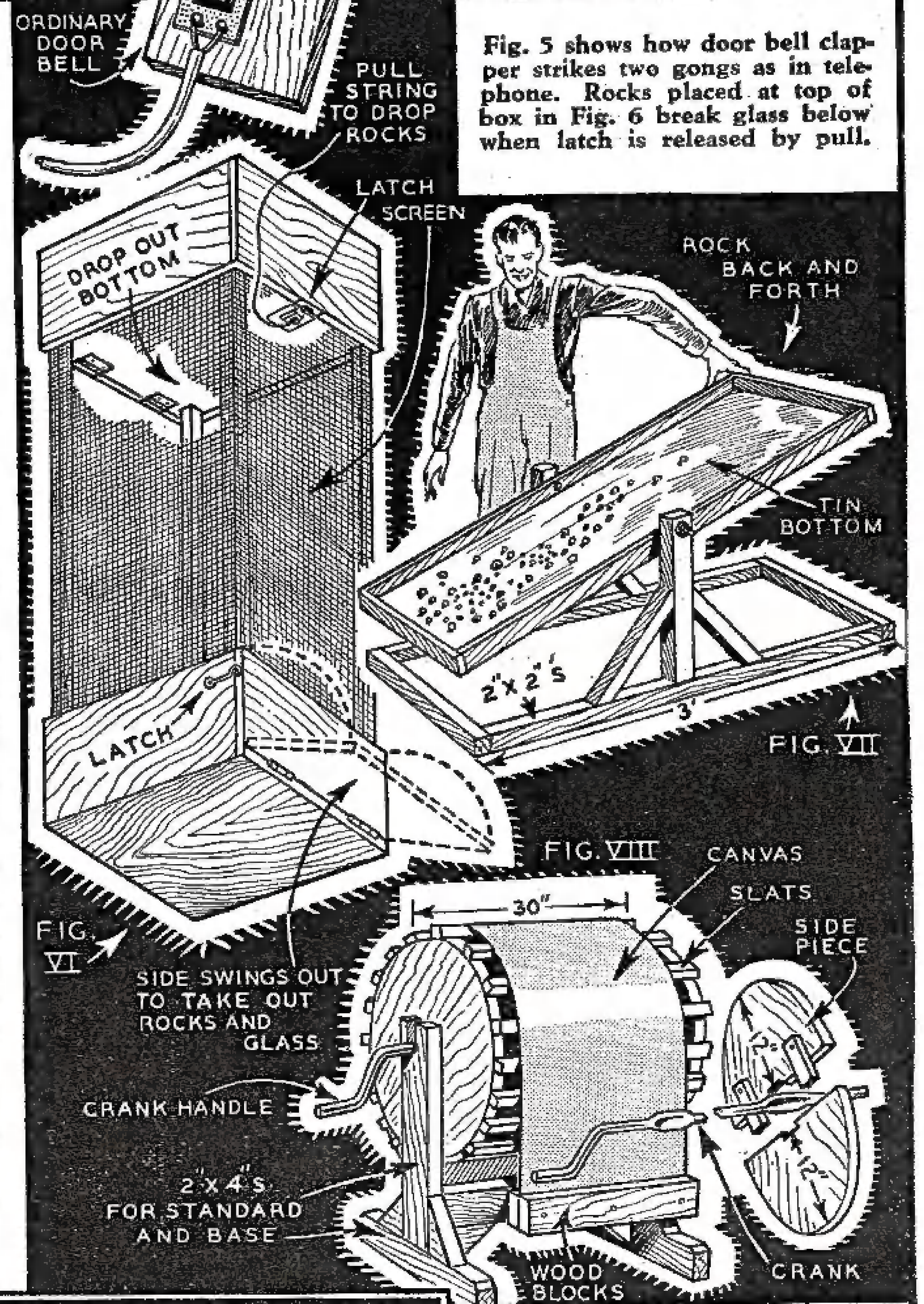
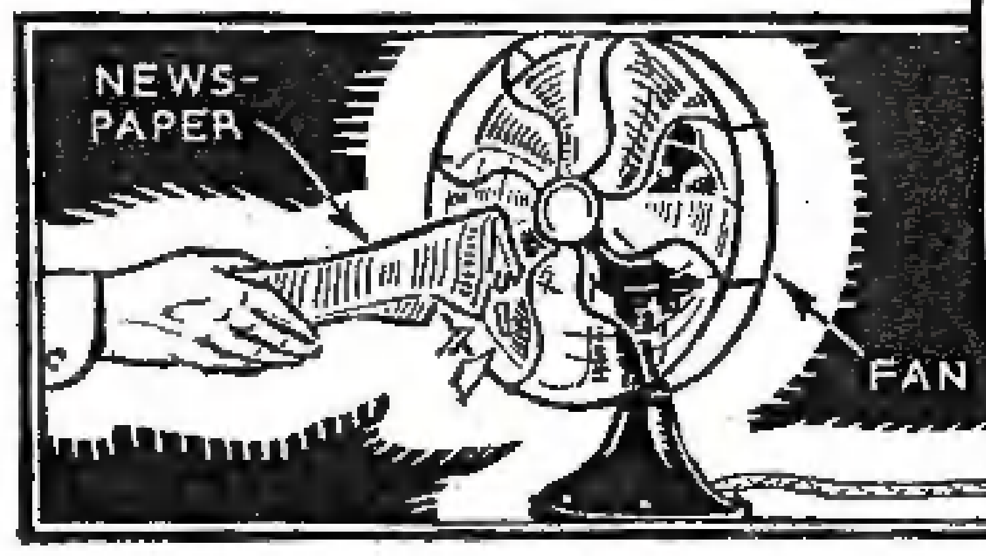
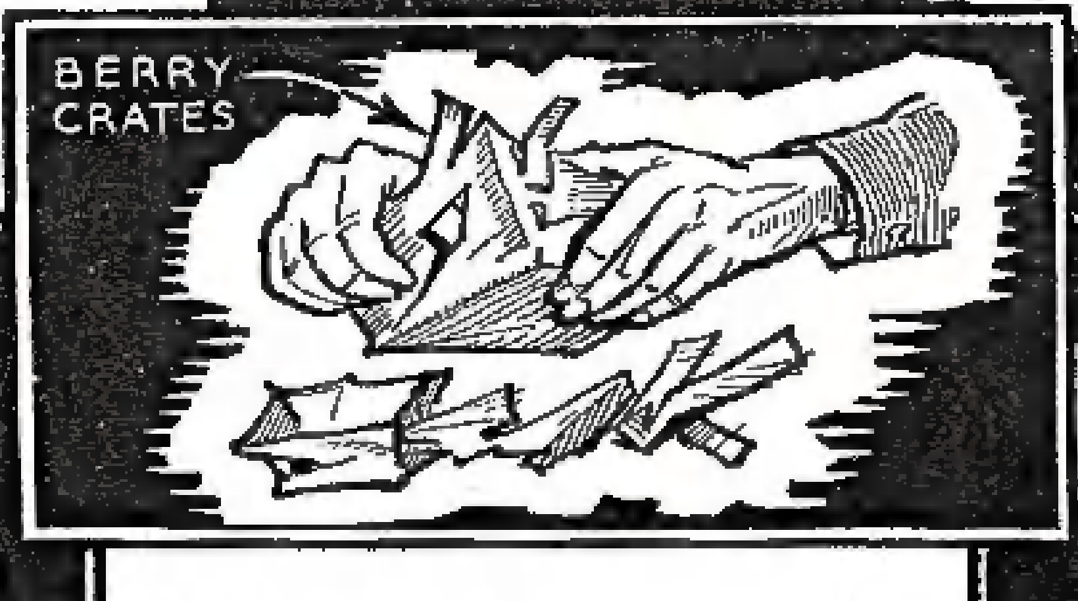


FIG. V
ORDINARY DOOR BELL
PULL STRING TO DROP ROCKS
LATCH
SCREEN
DROP OUT BOTTOM
LATCH
FIG. VI
SIDE SWINGS OUT TO TAKE OUT ROCKS AND GLASS
ROCK BACK AND FORTH
TIN BOTTOM
2"x2"S
3'
FIG. VII
FIG. VIII
CANVAS
30"
SLATS
SIDE PIECE
CRANK HANDLE
2"x4"S FOR STANDARD AND BASE
WOOD BLOCKS
CRANK
12"

Fig. 5 shows how door bell clapper strikes two gongs as in telephone. Rocks placed at top of box in Fig. 6 break glass below when latch is released by pull.

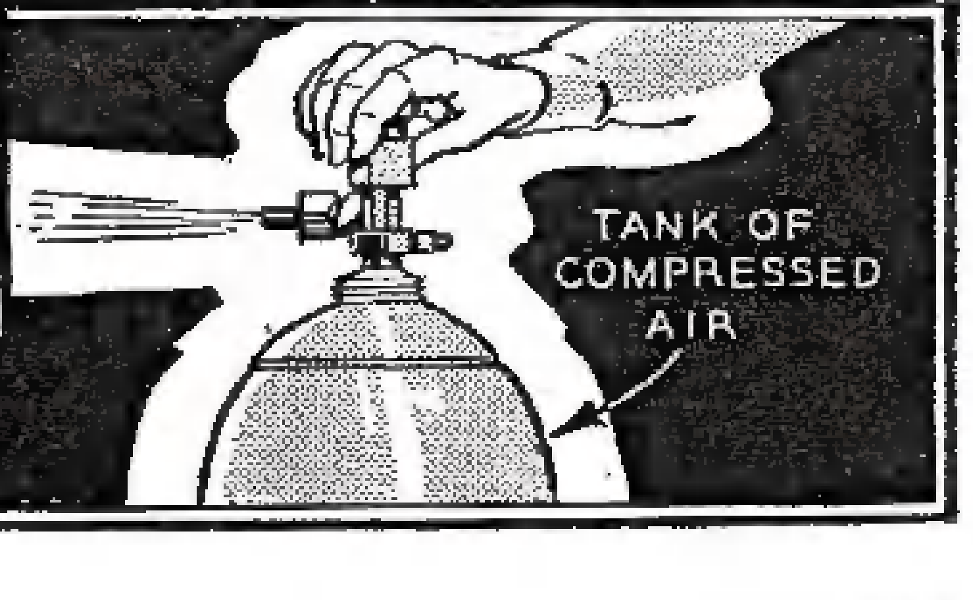
Whir and roar of stunting airplane is realistically reproduced by holding newspaper against electric fan.


NEWS-PAPER
FAN


BERRY CRATES

Breaking berry crates provides crackling of flames for fires.

Noise of escaping steam is made by opening compressed air valve.


TANK OF COMPRESSED AIR

FOR INVENTORS And Mechanical Minded Men How TO OBTAIN A PATENT

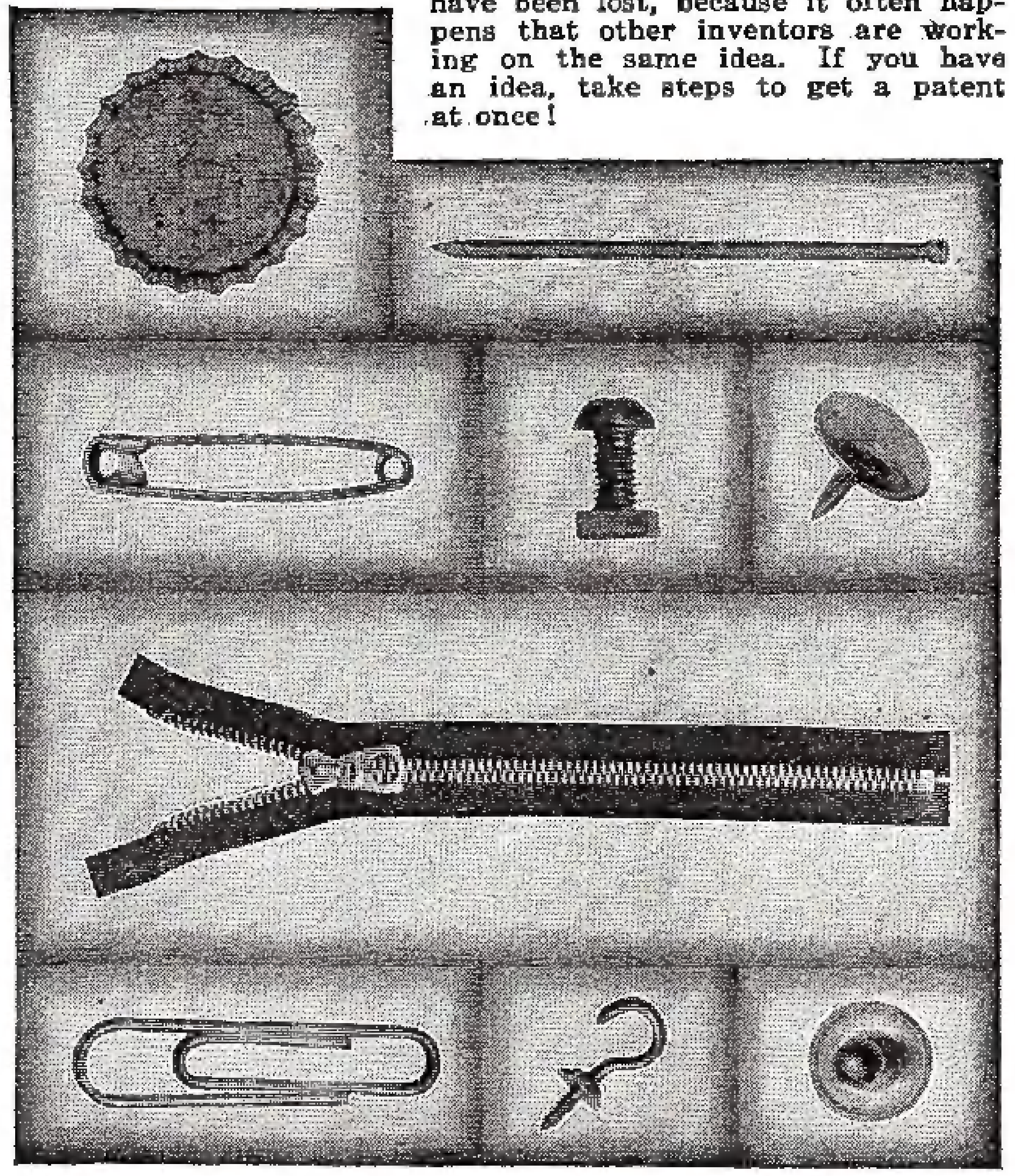
Answers to Questions on Page 20

1. For protection. A patent gives the inventor title for 17 years.
2. Dr. Elihu Thompson (over 700 Patents). Dr. Miller Reese Hutchinson (approximately 1000 patents). Thomas A. Edison (1101 U. S. — 1279 Foreign).
3. (1) Goodyear. (2) Nobel. (3) Sinfelder. (4) Roentgen.
4. The U. S. Patent Office has said in this connection that "the preparation of an application is a highly complex proceeding and generally cannot be conducted properly except by an attorney trained in this specialized practice."
5. A partial list of some inventions and discoveries is available by writing for my booklet. Space here is too limited.
6. It is generally advisable to approach a manufacturer only when application covering the invention is on file in U. S. Patent Office.
7. Attorney's fees can be paid in installments.
8. No; having a patent attorney at Washington can save expense and time.
9. The first adding machine.
10. Quantity production of Industry. He built the first machinery for standardizing the parts and manufacture of government muskets in the War of 1812.

CLARENCE A. O'BRIEN
Registered Patent Attorney
317-P Adams Building
Washington, D. C.
(Copyright Clarence A. O'Brien)

Small Ideas May Have Large Commercial Possibilities

If you hope to realize profits from your invention, you must protect it with a United States Government Patent. Otherwise you may find that all your time and labor have been lost, because it often happens that other inventors are working on the same idea. If you have an idea, take steps to get a patent at once!



THE Free Book shown here was prepared for inventors, to show them exactly what steps they must take to secure a PATENT. If you have an idea, you should send for this book AT ONCE. It will tell you exactly how an application for a Patent is made, what information you must furnish your attorney, and what steps he must take in order to protect your interests. Remember, inventing an article is one thing—securing the exclusive right to manufacture it, use it or sell it is another. Without a U. S. Patent, you cannot expect to reap the profits that your invention may make possible. Send at once for this book. After you get that, you'll know exactly what to do to protect yourself.

YOU CAN PATENT

New Ideas for Improvements in Machinery, Articles, Designs, Formulas, Etc.

EVERY year thousands of Patents are granted. Very few, however, represent the discovery of entirely new principles. Most of them provide new methods of doing some every-day thing in a better way—changes for greater efficiency, usefulness, adaptability, or beauty in some previously Patented thing. These IMPROVEMENTS are Patentable if new, and actually represent new invention. These Improvement Patents offer large chances for profit if commercially useful. The business world wants improved products and services.

THE FIRST IMPORTANT STEP IN SECURING A PATENT

is to obtain the services of a Registered Patent Attorney. Establish the date of your invention as explained in My Book and disclose your idea to him in correct form. He then makes a SEARCH of the Patent Office Records and reports to you on existing U. S. Patents which might bear on your invention, giving his opinion on the advisability of proceeding and filing formal application. How this inexpensive step can save you money, time and delay when Patenting your idea—how it tells you whether or not it is worth your while to file formal Application—all is explained in My Big Book—SEND FOR IT TODAY. If you have developed some improvement, something which adds to the usefulness of any product—whether this product is Patented or not—you should protect your improvement with a Patent at once. Send for My Big Book which tells you how.

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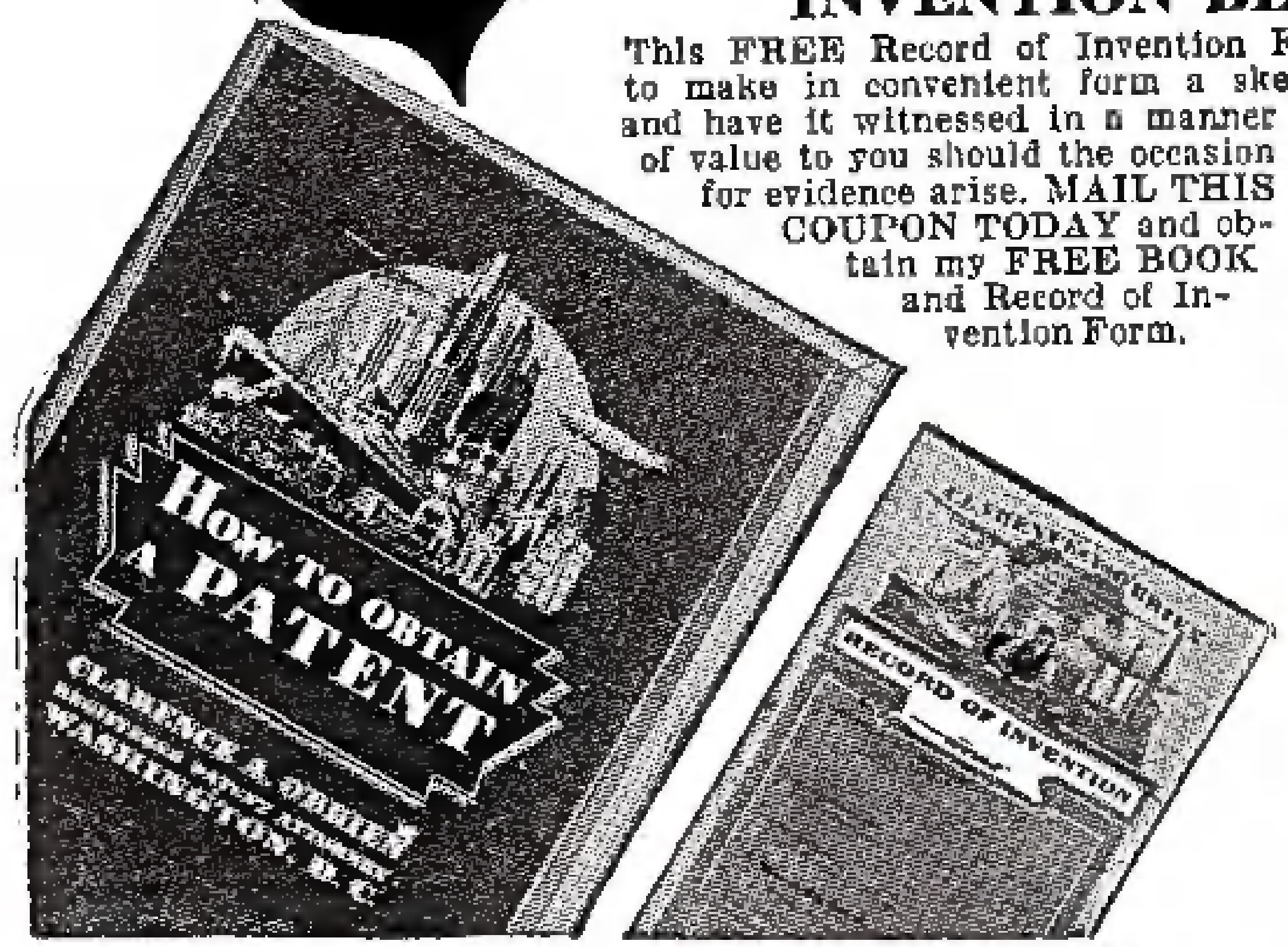

STEP NO. 1

Make a rough pencil sketch of your invention, describe it fully, and send it to me for preliminary search through U. S. Patent Office—fee $5.00.

STEP NO. 2

My trained searchers will then make a preliminary search of the pertinent U. S. Patents to determine if your invention is probably patentable.

STEP NO. 3

My complete report of search and opinion on patentability will be mailed to you with copies of U. S. Patents that I consider nearest to your invention.

STEP NO. 4

If you decide to make patent application, for customary fees explained in my booklet, my draftsmen will make drawings and proper papers will be prepared for presentation of your invention to the Patent Examiner.

CLARENCE A. O'BRIEN
REGISTERED PATENT ATTORNEY
317-P ADAMS BUILDING
WASHINGTON, D. C.

Please send me your FREE BOOK, "How to Obtain a Patent," and your "Record of Invention" Form, without any cost or obligation on my part.

NAME ....

ADDRESS ....

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(Important: Write or print name plainly)

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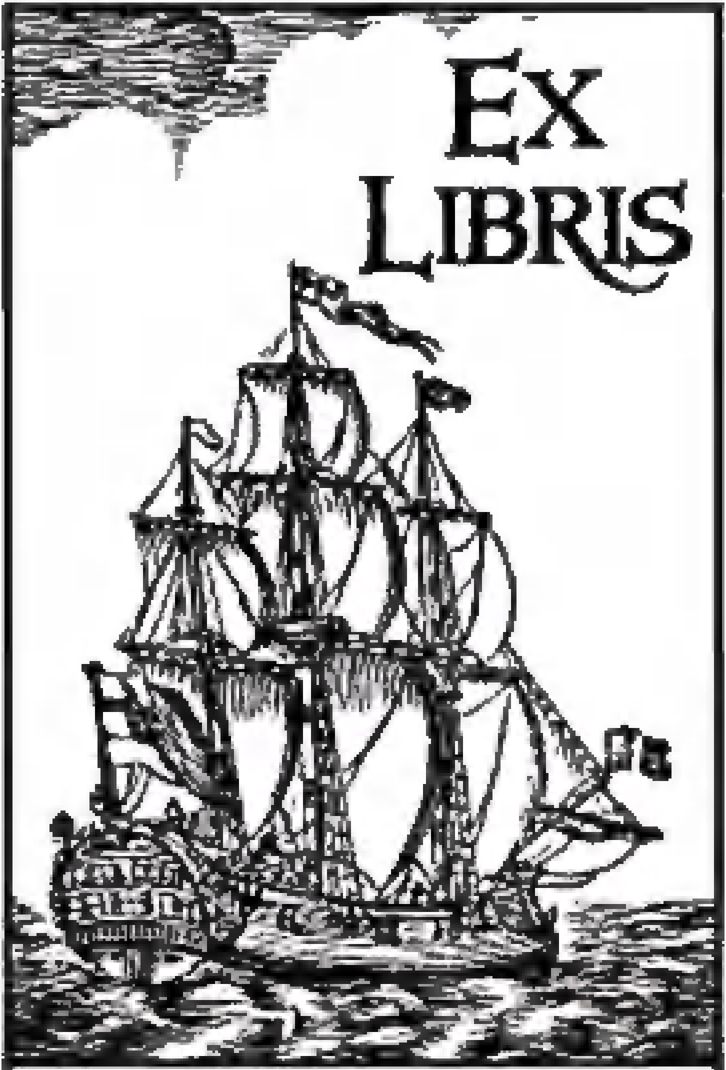

Anon. Malefactor